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MEN OF THE TLAPANECA TRIBE.

(See Chapter XXII.). *(Frontispiece.)*

THROUGH SOUTHERN

MEXICO

BEING AN ACCOUNT OF

THE TRAVELS OF A NATURALIST

BY

HANS Friedrich GADOW

M.A., PH.D., F.R.S.

WITH OVER ONE HUNDRED AND SIXTY FULL PAGE AND OTHER ILLUSTRATIONS AND MAPS

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TO

C. B.

PREFACE

THIS narrative is based upon two journeys through Southern Mexico during the months of June to September of the years 1902 and 1904. Eight months—most of them spent in roaming about, off the few tourist-tracks, through some rather wild and little-known districts, from the regions of snow down to the sweltering, tropical lowlands—afforded more than hasty impressions of this wonderful country.

I have tried to present to the reader the ups and downs, the enjoyments and the drawbacks, just as they happened. We, my wife and I, have no blood-curdling adventures to relate, and yet some of the incidents might have turned into such—by a hair's breadth.

As to personal safety, the actual conditions were tersely put to us only a few weeks ago : " You do not need any arms whilst travelling in Mexico, but when you do, you want them badly."

The scientific purpose of these travels was the study of the distribution of animals and plants with reference to the prevailing environmental conditions. Some of the more technical results have been published in the Proceedings of the Royal, the Zoological, and the Linnean Societies of London.

Care has been taken to mention the various creatures at the time and place that we observed them. The country swarms with life, and yet days may pass without a glimpse of anything worth relating, and the best finds are made when least expected. Full-coloured pictures of the life and scenes of a typical day's travel in the wilds, if we put them to the test, are liable to cause disappointment, since the majority of the exciting events (though each described without exaggeration) rarely happen in conjunction.

The photographs of the Tlapaneca country we owe to the kindness of Mr. W. Niven, Mineralogist, Mexico City, who had taken them on another occasion.

It is a pleasant duty to acknowledge the great assistance and invariable courtesy received from the A. T. & Sa. Fé Railroad, and from all the railways in Mexico. Above all, our way was smoothed by the Mexican Government, thanks to the initiative of General Pedro Rincon Gallardo, the Minister accredited to St. James's, and of Don Ignacio Mariscal, the Minister of Foreign Affairs. The President, General Porfirio Diaz, taking a personal interest in our plans, gave us letters of special recommendation to the Governors of various States. Without all this help, and many acts of friendship, we should have a different tale to tell.

H. GADOW.

In Camp, Volcán del Torullo,
Michoacán,
June 10*th*, 1908.

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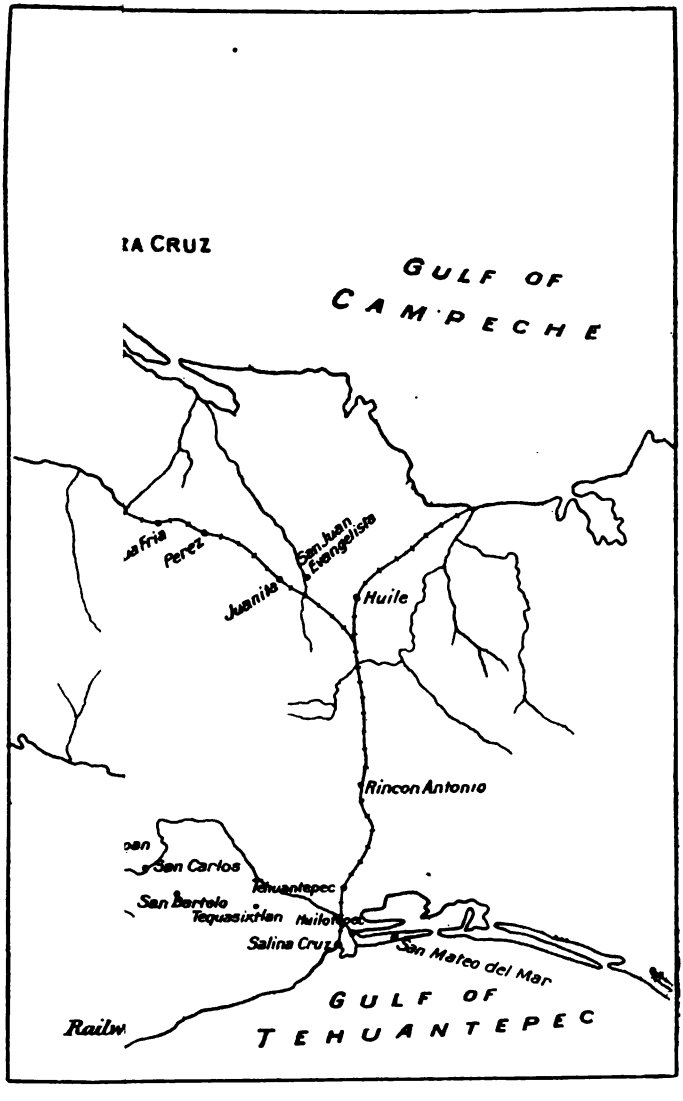

THE AUTHOR.

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CHAPTER I.

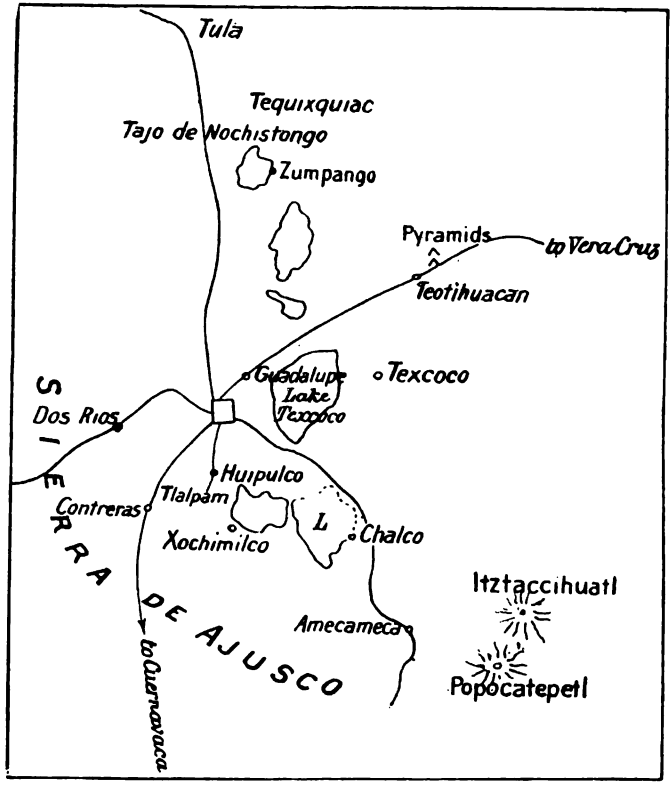
THE VALLEY OF MEXICO.

Situation of the Capital—Former Inundations from the Lakes—The Floating Gardens of Xochimilco—The Axolotl: its peculiar Life History; zoological controversies and new explanation of its non-metamorphosis—The Pyramids of the Sun and Moon at Teotihuacan.

The broad plain called "El Valle de Mexico," in which the capital lies, is the bed of an old lake, surrounded by hills of late volcanic formation. Here and there arises out of the valley, which measures some twenty miles or more across, a solitary knoll like that of Chapultepec (the "Grasshopper Hill"), the reputed summer retreat of Montezuma. The beautiful palace erected on its top by Spanish viceroys is now the official residence of the President and the seat of the National Military Academy. Most of the valley is absolutely flat, with swampy marshes and meadows intersected by innumerable ditches, except where, on slightly rising ground, the volcanic rock, often in the form of lava, appears on the surface. Dozens of rivulets, and even streams, drain into this valley, which has no natural outlet; especially numerous, and for the most part permanent, are the streams which come from the well-wooded heights of the Sierra de Ajusco and the Montes de las Cruzes. to the south and west of the valley. We must not forget that we are here on a highland plateau, the city lying at an altitude of 7,400 feet above the level of the sea, whilst the Sierra de Ajusco rises to more than 10,000 feet.

Some four miles to the east of the capital lies the large lake of Texcoco, and more than double this distance towards the south-east are the lakes of Xochimilco and Chalco. These

three lakes—and several others to the north on higher ground—are the last remnants of the original large lake. How long ago that was, it is impossible to tell, history dating back scarcely four hundred years in Mexico, but even at the time of



THE VALLEY OF MEXICO.

the Conquest at least, Lake Texcoco was much larger than it is now. Its water is brackish, and it was already even then quite undrinkable, when it extended to and even surrounded the city. It is known that the Aztecs had constructed a causeway by which they not only communicated with the dry land, but also shut off the brackish from the fresh water which came

down from the hills to the west. Cortez attacked the old Tenochtitlan by water, in brigantines, and the whole town was intersected by canals. In fact, it must have been a kind of Venice on a smaller scale: in less poetical language, a lake-dwelling settlement.

Its present condition is widely different. The whole of Tenochtitlan—this was the name of the famous Aztec capital —with its Teocallis and numerous other temples and monuments, was completely destroyed, being levelled to the ground, or rather thrown into the canals, and thus forming the foundations upon which, by degrees, an entirely new city, the present Mexico, has arisen.

It was an act of vainglorious folly, almost amounting to insanity, for the Spaniards to rebuild the town destined for their capital upon a spot so liable to inundations, that even the Aztecs had made attempts to mend matters. Each of the six lakes is fed by streams which, during heavy rains, are converted into torrents, so that the northern lakes at least are sure to overflow and discharge their waters into the Texcoco Lake, which lies, together with the city, at the bottom of the whole valley. If it is true, as has been asserted, that the Spaniards, in their usual ruthless way, stripped the then existing forests from the slopes of the hills, the danger of sudden inundations was thereby vastly increased.

Disastrous floods repeatedly submerged the new capital, sometimes for years, since there was no natural outlet from the valley, and the loss by evaporation during the dry season was more than balanced by the next wet season's downpour. Then for about 150 years hundreds of thousands of natives were forced to toil in carrying out the plans of one Martinez, a Dutch engineer, originally named Maartens, who had been attracted to Mexico by fabulous sums from the classical land of canals and dykes. This is the origin of the famous "Tajo," or cutting, of Nochistongo, a gigantic ditch, now mostly dry, which is sure to attract the traveller's attention as he rushes past it in the train coming from the north. It intercepted at least the waters of the north-western streams, and of the Zumpango Lake as well. Henceforth the capital was secure

against submersion, but another danger, permanent and much more subtle, remained, viz., the unhealthiness of the ground itself, sodden as it was with the filth of half a thousand years. The contents of the usual mediæval sewers were collected by the canal of San Lazaro, an ominous and, as it proved, appropriate name. Theoretically, it discharged into the Texcoco Lake more than three miles off; but it always was, and its remains still are, a pestilential ditch, and whenever the water in the lake rose a few feet, the whole of the sewage system was reversed, and the people died at a rate which, but for the great altitude of the town, would have been terrific.

All this has been changed. In the year 1900 the President, General Porfirio Diaz, inaugurated the tunnel of the gigantic works, which now furnish a reasonable sewage system, the sewage being taken up by a new canal 43 miles long, so constructed that it carries off the overflow of the Texcoco and the northern lakes, together with the intercepted spate-water of the streams. Near Zumpango, due north of the capital, this canal turns into a tunnel more than six miles in length, which at one spot descends through the hills at a depth of more than 300 feet below the surface, to discharge its contents near the little village of Tequixquiac into a small tributary of the Rio Panuco, which falls into the Gulf of Mexico at Tampico.

A great city of about 400,000 inhabitants, built up on sands and clays, and raised but a few feet above swamps sodden with decaying matter, cannot easily become a very healthy place. The water supply is ample, but the water itself is vile, and is pumped into high but exposed iron cisterns, coming out warm and often turbid. The climate is, up to a certain point, delightful, but there is no such thing as a warm night known in Mexico City; the air gets very chilly with the setting sun, and the rarefied atmosphere does not suit every constitution.

The nearest shores of Lake Texcoco are now several miles away to the east of the town. Where these shores are it is impossible to say exactly. The present mean level of the lake is only about six feet below the lowest part of the town. The

lake has, during the last few centuries, been silting up fast. It is shallow, and nowhere bordered by higher ground, so that a rise of but a few feet suffices for the lake to spread over many square miles of the neighbourhood, which, during the dry season, is partly covered with a white saline crust, interspersed with scanty grass, on which cattle and horses eke out a precarious existence. The lake is not quite dead; it contains several kinds of tiny fish, only one of them of any commercial value. According to Dr. S. E. Meek,* who has studied the freshwater fishes of the country, in the whole of the Mexico valley only ten kinds of fish occur, and five kinds of these are peculiar to this valley, while the others occur also in the basin of the Rio Lerma, which flows through Lake Chapala and then as the Rio Grande, or Santiago, through Jalisco into the Pacific Ocean. This distribution of the fish fauna alone is sufficient evidence that originally the valley of Mexico formed part of the Lerma system, from which it has been shut off by the subsequent elevation of the present hills. Moreover, that this event has not taken place very recently is indicated by the fact that about five of the Mexico valley fish are peculiar to this valley; in other words, some of the original stock had time and opportunity to change into these species.

While Lake Texcoco is a dreary waste of water, only enlivened in the autumn by numerous waterfowl, Lakes Chalco and Xochimilco present a very different appearance. They are situated, perhaps, ten feet higher than the Texcoco Lake, and from the intervening five or six miles of land arise two picturesque hills. Both lakes contain fresh water, and they are surrounded by fertile meadows. The Chalco Lake was rich in fish, and also contained many tortoises (*Cinosternum hirtipes*), which are brought daily to the market in the capital. Unfortunately, this lake has been cut in two by a railway which passes right across it, and it has moreover been nearly drained off for agricultural purposes. This "improvement" put the fishing population into a state of indignant excitement, since they had originally been given to understand that their ancient

* S. E. Meek, "The Freshwater Fishes of Mexico North of the Isthmus of Tehuantepec." Field Columbian Museum, Chicago, 1904.

rights should not be interfered with. They knew perfectly well that none of themselves, since they had been fishermen from time immemorial, and breeders of cattle for the last three hundred years, would take to ploughing the newly reclaimed land, and that the benefits of the change would after all be reaped by strangers. Of what good would be their fishing rights when there was no longer any lake, or only a much

THE "CHINAMPAS," OR FLOATING GARDENS, OF LAKE XOCHIMILCO

restricted area, to fish in? Such instances are not uncommon, and they teach the Indians to look with sullen suspicion upon every new enterprise.

The two lakes are separated from each other by a narrow natural ridge, almost like a dyke or causeway, which was used by Cortez on his march from the south to Texcoco. Lake Xochimilco, which means in Aztec "flower-field," is an earthly paradise. Towards the south the mountains slope down,

here and there with small detached outlying foothills in the midst of fertile pastures with shrubs and trees, little streams, rocks and ravines. The northern side has, properly speaking, no boundaries, since it changes gradually into a swamp with tall rushes, reeds and willows, and agaves growing close by on the drier sandy patches. The ancient Viga canal leads through this mixture of swamps, waste lands and meadows, and fields of maize, maguey and chili, or capsicum, extend right into the southern-most Indian part of the capital, the waterway being enlivened every morning with dug-outs and other primitive craft, laden with garden produce and punted along by natives, most of whom come from the village of Xochimilco, and who, although living so near the capital, have continued to practise, *sub rosa*, and therefore all the more tenaciously, many of their ancient rites and customs.

A visit to this marvellous place is easily accomplished. An electric tram starts from the centre of the capital for Tlalpam, but it is better to alight at the previous station of Huipulco, whence an interesting (though sandy) walk of two hours takes one to the village. Unless there are clouds, as there usually are in the rainy season, the snow-clad giants, Popocatepetl and Iztaccihuatl, right in front, make a picture not easily equalled. The natives are accustomed to visitors, and are eager to take them for a boating tour along the ditches that run through the village, and then into the lake, which has, however, comparatively small stretches of open water, half its surface, perhaps more, being taken up by the celebrated "chinampas," or so-called "floating gardens," which consist of hundreds of large and small islands, separated by ever so many wide or narrow canals. The term "floating gardens" has been objected to by some prosaic people, because the islands do not float, and it cannot be proved that they ever did. The fact is that new islets may still be watched in the process of formation; floating masses of peat, rushes, and grass, all tangled together, which sometimes form clumps of only a few square yards, are caught, combined and anchored by means of stakes or long willow and poplar saplings, which are driven into the muddy bottom, where they soon take root. The

fertile mud is then ladled up from the bottom, and heaped up upon the floating mass, which in course of time is thus converted into an island proper, a patch of garden land being eventually produced on which are cultivated masses of flowers, melons, pumpkins, gourds, and other kinds of vegetables. The larger islands, some of them several acres in size, are mostly surrounded by tall poplars planted in rows along the edges, the trees thus forming a firm boundary. Undue shade is avoided by lopping off the side branches. None of these "chinampas" rise more than a foot or two above the water-level, and some of them are firm enough to support houses ; whether they were born islands, or are artificial, is immaterial—suffice it to say that many of these gardens are still as unsteady as a bog, especially the newly-annexed portions. The property laws, concerning boundaries, are intricate ; for instance, whatever a man catches and annexes is his, but he must not on that account obstruct the existing waterways which, thanks to the continual dredging or rather ladling up of the mud, and dragging for water weeds, are kept in a tidy condition. Only the wider open stretches are covered with masses of nymphæas, or with the mauve-blooming pistacias, which float in the water, buoyed up by their peculiar swollen leaves. The depth of the water averages, perhaps, from five to ten feet.

The lake is only fed by a few streams, but at various places clear water wells up from the bottom, especially at the famous " ojos de agua," or springs near the southern end, which are very deep, and yet so clear that the inevitable traces, in the shape of broken bottles, left by the " tourist fiend " can be seen at the bottom. The further away we go from these powerful springs, the muddier and darker appears the water, which is full of decomposing vegetable matter and teeming with fish, the larvæ of insects, worms, and the famous axolotl. This name, pronounced aholotl or ajolotl or ajolotes (with the Spanish plural), was given by the Aztecs to a large newt, about eight inches in length, which was, and still is, brought daily to the market in the capital. This black, fish-like creature superficially resembles a loach, but has three pairs of delicate much-branched external gills, four limbs, and a long tail

with a broad dorsal and ventral fin. It is eaten either fried in oil or simply seasoned with vinegar and chili, the red capsicum pepper.

THE AXOLOTL.

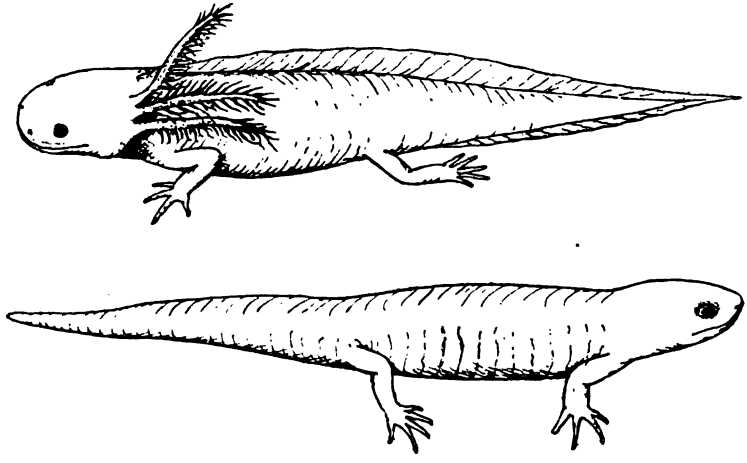
The point of interest to the zoologists who named the axolotl* *Siren pisciforme*, or *Siredon Gyrinus mexicanus*, consisted in the fact that this creature always retained its gills, and therefore had to be classed with other perennibranchiate amphibians, such as the North American *Siren*, the "mud-eel," *Necturus*, the "water-dog," and the *Proteus* of the caves of Adelsberg, in Istria. Cuvier, however, suspected that the axolotl was but the larva of some otherwise unknown terrestrial newt. The mystery was not cleared up until, in the year 1865, something happened which threw the zoological fraternity into great excitement, and made the axolotl, together with the lakes of Mexico, famous. The whole history is of such general biological importance, and so interesting in detail, that it may be thought worth re-telling, in spite of, or rather perhaps because of, the many, mostly garbled, accounts already existing.

The first living axolotls, several dozen in number, which ever left Mexico, were brought to France late in the year of 1863 by Marshal Forey on his return from the first French expeditionary muddle in Mexico. Five males and one female were then kept in the Jardin des Plantes, where they spawned in the same winter, and a large number of young were reared. From this fact it was naturally concluded that the *Siredon* having bred in its gilled condition, was not the larva of something else, but, so to speak, the representative of a genus in its own rights. A year later this second generation, born in Paris, propagated, and the offspring developed, as before, into typical axolotl. But, lo and behold! it was observed that several of these young ones gradually developed yellow spots on their hitherto dark skin, and lost the fin or crest of the tail,

* The most reasonable of the various attempted derivations of the name is that from *ā* = water; *jolʔa*, to sprout, diverge, change; *tl*, article; the changing water-creature, *i.e.*, larva, tadpole. "Hue-xolotl" (hue = old) is the name of the male turkey.

whilst their bunches of gills shrivelled up, and they then left the water and lived the life of terrestrial newts. The axolotl had, in fact, metamorphosed themselves into a kind of lung-breathing land newt, which was already known as the *Amblystoma tigrinum* from many other parts of North America.*

A considerable literature has grown up around the axolotl, all written by men who have never been in Mexico, with the exception of De Saussure and a Mexican zoologist, who had



Upper figure—AXOLOTL. Lower figure—AMBLYSTOMA.

recently settled the whole question in a novel and startling way, viz., that in the lake they are unable to transform themselves for want of food! Fancy the idea that the over-crowding of the lake, which is teeming with food, should at one and the same time cause them to suffer from want of food and also produce these big, fat, oily axolotl!

Naturally, we were all the more eager to examine not only the lakes but also the whole neighbourhood, with especial reference to these strange creatures. The first discovery we

* Good illustrations of the accompanying changes of the skull are given by Wiedersheim, "Zeitschrift f. wiss. Zoologie," XXXII., Pls. 11 and 12.

made was that there are no axolotl whatever in Lake Texcoco to which alone Weismann's dismal and fanciful explanation could apply, that the newts could not leave the lakes on account of their salt-encrusted shores, and therefore were obliged to remain in their gilled condition.

The description of the lake of Xochimilco, given above, will be sufficient to show that it is a very paradise for these creatures, with its abundance of fresh water and food, and without anything in the way of natural obstacles which could prevent them from leaving the lake. The fishermen who punted us about in dug-outs knew all about the axolotl: how they bred early in the spring, about February; how their eggs were fastened singly to the water-plants; how soon afterwards the little larvæ swarmed about in thousands like other tadpoles; how they grew at a great rate, always remaining dark and never becoming piebald or marbled over with yellow, until by the month of June they were all grown-up, ready for the market. Indeed, we could not get any small specimens in June. Later in the summer they take to the rushes, and in the autumn they seem to become scarcer, at least they are then more difficult to get. Sometimes they are caught in nets, more frequently they are speared with a pronged fork. Although we often went to the market in the capital, there were rarely more than a few dozen for sale, whilst in the market in Xochimilco also they were only brought in a few at a time. None have ever been known to leave the lake or to metamorphose.

The reason why this particular clan of axolotl does not change is now obvious. The unfailing abundance of food and water, the innumerable hiding-places for them in the mud, under the banks, and amongst the reeds, all these features are attractions so great that the creatures remain in their paradise, and consequently retain all those larval characters which are not directly connected with propagation. There is nothing whatever to prevent them from leaving this lake and becoming land newts, but there is also nothing to induce them to do so.

So far, so good. We all agree that permanent life in the

water has caused the retention of the gills of what would be the *Amblystoma tigrinum*. But within a few miles of this famous lake, in the very mountain streams which come down from the Sierra de Ajusco into the valley of Mexico, lives another kind of axolotl which regularly passes through its larval stage and then remains in the water as a lung-breather, a typical *Amblystoma* without gills. This is *Amblystoma altamirani*, described in 1896 by Dr. Dugès,* now an aged French gentleman living in Guanajuato, who has contributed many valuable notes to the natural history of his adopted country.

Accompanied by two young zoologists we went by the Mexican National Railway to the station of Dos Rios, 8,800 feet above sea level, and soon fished out of the little streams several dozen larvæ and adults. On another occasion, in the month of September, we took the Cuernavaca Railway to the station of Contreras, situated at an altitude of 8,090 feet, at the foot of the Sierra de Ajusco. The creatures lived in the cool, rushing streams, preferring the sheltered side of large boulders with little patches of sand, the larvæ working their gills vigorously, the adult motionless and never coming to the surface. All were extremely shy, and very swift of movement, skimming along the bottom and seeking shelter at the slightest alarm in dark places between the boulders. The native millers knew them well. They called them "axolotes sordos," "deaf," having no ears or rather no gill openings, and described them as "axolotes sin aletas," without winglets, or earrings, meaning gills.

When I searched for them on land, in the meadows and under stones or trees, the people laughed at my ignorance in expecting to find "fishes" on dry land. There are no fishes in these streams, but this, *their* fish, they pronounced to be "no good," because these "axolotes del cerro"—mountain axolotl—are not eaten like the "axolotes del lago."

We tried to bring specimens of both kinds home alive, but only three survived the perils of the journey. As it is strictly forbidden to take anything alive into the Pullman cars, I put

* "La Naturaleza," 2nd Series, tom. III. Mexico, 1896.

various baskets, cages and vessels, into the next passenger car which happened to be empty, but overnight a gang of navvies broke in, cleared out the whole of a travelling fruit-stall, and rummaged my things into the bargain; not finding any edibles, they drank off the spirit from some of the bottles, and, finding an unexpected sediment of preserved specimens in them, their wrath was roused, and they smashed and scattered the rest. This, at least, was the explanation given by the conductor. On the last journey home our livestock was, by kind permission, carried in the van of the Wells' Fargo Co., and all would have gone well if the four days' journey to Chicago had not been converted into a sojourn of eleven days in the train, owing to the most appalling series of "wash-outs" and collapsed bridges. These delays began in North Mexico, and reached a climax in New Mexico and Colorado, so that on the seventh day we found ourselves once more at El Paso; then they dogged our progress all along the diverted route through Texas, Indian Territory, and Kansas. The effect on our poor reptiles, amphibians, and birds can be imagined.*

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* The following note contains a further, more technical, discussion of this important axolotl question:—

The classical specimens, metamorphosed into *Amblystomas*, also bred occasionally after some years. The other axolotls continued to breed and to produce axolotls by thousands, and with these and their descendants numerous aquaria on the Continent and in England were stocked, so that they could be bought for a few pence each in the year 1879. In the following years something went wrong; they were attacked by fungoid growths, whole colonies died out, or became sickly, and now a healthy breeding pair is comparatively difficult to get. It is possible that the undoubted deterioration was due to incessant in-and-in breeding, no fresh specimens having reached Europe again.

This extraordinary behaviour of the axolotls caused much excitement, and they were subject to many careful experiments, and to comparison with other newts. There are many kinds of *Amblystomas* in North America. They behave like the vast majority of terrestrial newts, that is to say, they spawn in the water; the gilled larvæ are gradually transformed into gill-less, entirely lung-breathing, creatures. But numerous cases have become known in which, for some reason or other, this transformation is retarded, sometimes for so long that the creatures reach sexual maturity, but retain those larval characters which fit them for aquatic life. Such phenomena are described by the term neoteny, *i.e.*, retention of juvenile characters. In many cases the changing of tadpoles, or of newt-larvæ, can be delayed simply by preventing them from leaving the water. *Amblystoma tigrinum*, the species of which our axolotl is the larva, metamorphoses regularly, from New York to California and to Central Mexico,[1] so that the behaviour of the specimens in Lake Xochimilco

[1] Even in the lakes to the north of the capital, described by José M. Velasco, "Naturaleza," tom. IV., pp. 209-233; with three plates. Mexico, 1879.

Those who do not care about axolotls or the sweet scenery or the floating gardens of Xochimilco, and prefer antiquity, should not fail to pay a visit to Teotihuacan, where amongst the Pyramids of the Sun and the Moon they will have plenty of food for reflection. The excursion can easily be made within a day by the Mexican Railway, the train leaving at 7 a.m. and returning to the capital about the same hour in the evening, the distance being only twenty-seven miles. From the train the pyramids do not look very imposing, but rather like big mounds of earth. Less than an hour's walk from the station, through the miserable village, inhabited by poor but friendly Indian agriculturalists, takes us to the spot. Teotihuacan, the Aztec name, means "where many gods are," the Pantheon, but the Aztecs do not seem to have had the faintest idea who had built the place, this having, at the time of their arrival in the Valley of Mexico, about the year 1000 A.D., already been

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is all the more exceptional. However, these are no longer unique, since sexually ripe specimens, ready for breeding purposes, and yet typical axolotls, have been found in the States of Colorado and of Jalisco. The question would have been solved long ago if a competent zoologist had studied it in this particular spot. But De Saussure seems to have been the only naturalist who went there in or about 1867. He suggested that the swamps which extend between the water and the dry land prevented the creatures from gaining the latter, and therefore from transforming. This is wrong, since thick rush-swamps fill the northern end of the lake alone, whilst there are thousands of inviting places for newts to leave, if they should want to do so. Then A. Weismann[1] evolved another explanation. According to him, the specimens in the Mexican lakes were prevented from becoming perfect *Amblystomas* because they could not cross the saline, uninhabitable crust now covering, in his own imagination, the shores of these lakes, as they have more and more receded since the devastation of the forests that once surrounded them. He went further, and, by the use of his well-known dialectic power, has succeeded in spreading the notion that the axolotl is not only a case of reversion to an ancestral stage, but that the present *Amblystoma*, instead of being the progressive, perfect, final form, is likewise a case of reversion. He started with the wrong assumption that the true perennibranchiate newts represent the true ancestral stage of all amphibia. The next stage would be the lung-breathing terrestrial newts, such as *Amblystoma*; hence, if its young, owing to adverse circumstances, "revert" to the ancestral perennibranchiate stage, and if some of the axolotls lose their gills and fins, they "revert" thereby to the original *Amblystoma*. A reversion from a reversion! Surely a round-about way of explaining the curious, but after all fairly simple, process of neoteny!

It seemed the obvious thing to do to search for a cause which might be reasonably expected to *prevent* these amphibians from leaving their nurseries Here the various writers have been strangely unsuccessful. De Saussure's explanation is inadmissible, and that of Weismann could apply only to Lake

[1] "Zeitschrift f. wiss. Zoologie," XXV., (1875), p. 297-334.

deserted by a prehistoric race, the so-called Toltecs. Crossing the plain there is a little river. Near its southern bank stands the so-called citadel, a square formed by an enormously thick wall of earth which carries fourteen small mounds upon it and encloses another in the centre, with traces of buildings. From the northern bank of the brook leads, in an absolutely straight line, in a direction north by north-east, the "road of the dead," nearly a mile in length and 250 feet wide. It ends near the Pyramid of the Moon. The Pyramid of the Sun stands about half-way, a little to the east of the road, and is much larger, being more than 200 feet high. Both consist of huge mounds of earth, terraced and faced with hard smoothed mortar; but most of the outside has crumbled away, or rather, has in time become covered with dust and *débris*, so that the general appearance of these structures is now that of huge mounds covered with grass, herbs, and scattered shrubs. The Pyramid

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Texcoco, in which however the axolotl does not live, and the various statements that specimens have come from that lake are erroneous. They have been bought at the market of Mexico City, where the only answer one gets from the vendors, natives of Xochimilco, as to their origin, is "del lago," which means of course "*their* lake," but not the lake of Texcoco, which is visible from the city.

Herrera's[1] notion that they cannot change owing to want of a proper food supply is not only groundless but directly opposed to recent experiments conducted by Dr. J. H. Powers[2] at Doane College, Nebraska. He found that ordinary axolotls can be hurried on towards their metamorphosis by the shock of starvation; the sudden withholding of food being sufficient for this purpose. When once sexually ripe, they are apparently incapable of changing, but that their ancestral habits are still latent in them, not quite forgotten, and capable of being revived, has been shown by the long and careful experiments conducted by Marie de Chauvin[3] with the descendants of the Parisian stock. In the natives of Xochimilco Lake the inducements to remain in the water, their birth-place, have been too strong for these larvæ to give way to the full completion of their development, or rather to change those of their characters which had after all been acquired in the process of adaptation to aquatic larval life. Nothing is stunted in the development of their bodies. On the contrary, they become to a certain extent overgrown, and the sexual organs, which, at all events in most terrestrial *Urodela*, are active only during the temporary aquatic breeding-life, undergo their normal course of development and function.

One of the two specimens which I succeeded in bringing home in the late autumn of 1902 was an apparently full-grown typical female axolotl from the lake. In the winter it seemed to be in a condition ready to spawn; an

[1] "La Naturaleza," 2nd Series, tom. III. Mexico.

[2] "American Naturalist," June, 1903; and "Studies from Zoolog. Lab., Nebraska University," 1902.

[3] "Zeitschrift f. wiss. Zoologie," XXVII. (1876), p. 522 ff.; and 1891.

of the Sun has an entrance which leads into a chamber composed of cut stones. The top of this pyramid commands a good view of the plain, over which are scattered numerous small mounds and traces of buildings, indicating the former presence of a considerable population in this defenceless plain.

The most interesting feature of the whole is the "road of the dead," which is flanked on either side throughout its length by ramparts composed of lava stones, cemented together and covered with a whitish mortar which is very hard, smoothly polished, and on less exposed parts still showing ornamentation in bright colours, chiefly red and white. In and upon these ramparts are whole rows of small buildings, partly of sun-dried bricks, faced, and lined with cut lava stones and

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English-born male was therefore associated with it, but they did not show any inclination to breed. The male flourished, but the unique female began to refuse food and to become thin, and died in March, 1905, after having been kept two years and five months. Unfortunately, as the irony of fate would have it, it was at that critical time impossible for me to watch her, and this was all the more annoying since a post-mortem examination revealed, by means of the shrunken gills and fins, that she was on the road to metamorphosis.

Concerning *A. altamirani* all that was known was that they had been found in the Montes de las Cruzes at a reputed altitude of 10,000 feet. They are very rare in collections, perhaps because nobody has taken the slightest trouble to collect any since Dugès. The larvæ which we got in the month of June measured some 3 in. in length, and all had a bold piebald coloration of black and yellow. By the following September they averaged perhaps half an inch more in length, otherwise they presented no appearance of change; the adults were still in the water, one of them a beautiful yellowish albino. The larvæ were not, like the adults, restricted to the clear streams, but lived also in quiet water which was muddy and overgrown with watercresses and similar plants. In the streams of Contreras we found them up to 8,800 feet; further up they did not seem to occur, and we met with the same result two years later. One of the specimens caught at the end of September contained eggs that were nearly ripe. These newts go down to at least 7,900 feet, where this stream leaves the mountains and runs, though still swiftly, in its stony bed through the pedregal or lava-field, then through evergreen meadows into Lake Xochimilco. I can now add with certainty that this species is aquatic throughout its life. Curiously enough, when becoming adult, with a length of 6 in., it loses the yellow and black piebald coloration, which is so characteristic of the perfect *Amblystoma tigrinum*, and develops innumerable small blackish specks upon an olive-grey ground. It thus comes greatly to resemble the coloration of the lake axolotl, which is so very dark, nearly black, only, however, when the chromatophores are expanded; otherwise it is grey, with innumerable small black dots.

The solitary specimens of *A. altamirani* which reached England alive, were an adult, and a larva, 4 in. in length; the latter began to metamorphose within eight weeks, losing the gills and fins and closing the gill-openings, but it died before losing the piebald coloration.

mortar. There seem to have been shrines, those which have been opened being found to contain stone chests with human bones, ornaments, and earthenware. In the case of others, the whole of the interior is carefully packed full with blocks of stone, as if the rightful owners had taken out the sacred contents and then blocked up the shrines when they had to leave their pantheon, or mausoleum, for ever.

All over the ploughed fields the ground is literally strewn with broken bits of earthenware, and little "caritas," or masks, which can be picked up by the dozen. These "caritas," or little faces, are terra-cotta masks representing the front half of the human head, many of them of beautiful execution and showing several different types, none of which, it is customary to say, agree with those of any tribes known to have inhabited the country. The object of these little masks is a mystery. It is supposed by some that they were fabricated in many thousands, and represented the dead, of whom only the great were buried, while others were burnt. Not all these clay faces were individually made by hand; most of them were made from moulds, of which specimens have been found here and also at Mitla. Moulds of other terra-cotta objects, for instance, of vase-shaped idols, are still in the possession of the natives, although rare, and of course jealously guarded, the natives selling very good replicas of such idols to those who ask. After all, there is not much wrong about this. The moulds, the clay, and the locality, are the same as the originals, and the makers are, at all events, genuine Indians. It is different with a regular syndicate in the capital itself, which makes all kinds of antiquities and sells them as genuine, not only to tourists, but also to scientific institutions. Almost every other household in the village of Teotihuacan has handfuls of "caritas" and other bits of figures for sale; but the few frauds are so obvious, and so clumsily made, that they are easily picked out, and no offence is taken.

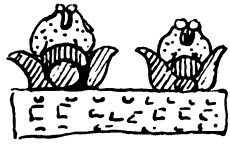
Many of these "caritas" have so much expression and individuality that one cannot help thinking that they were meant for likenesses. The commonest type shows a most peculiarly shaped head, very broad and flat on the top, with a

TERRA-COTTA MASKS FROM TEOTIHUACAN.

The top Figure, middle row, is a Whistle. The bottom Figure, middle row, is from Monte Alban.

very high forehead, whilst the face is small, neither cheek-bones nor nose being prominent, though the latter is broad. In some the eyes are very oblique, and converge towards the inner angle. Some of these flat-pated masks show straight hair dressed according to a certain pattern, or are crowned with an elaborate head-ornament. This same kind of headgear occurs on other heads, which are normal in shape, and this dress is found also on the clay figures and carvings of Monte Alban, near Oaxaca. The broad flat heads alone are peculiar, but they are reminiscent to a certain extent of those of the present Otomi. All these masks have at the back of the neck a stump-like projection, or "foot," indicating that they were stuck into something. Besides these masks other parts of figures are found at Teotihuacan; some of these are sitting cross-legged exactly like some of the large figures carved on the Pyramid of Xochicalco, or, again, on the monuments of Yucatan and Guatemala, a strong hint that all these prehistoric buildings owed their origin to one and the same race, and that one which had not much in common with the Aztecs, to whom, thoughtlessly but persistently, these and similar prehistoric buildings have been ascribed. However, the discussion of this thorny question is reserved for another chapter.

BLACK EARTHENWARE VASE,
From Teotihuacan.



HIEROGLYPH—XOCHIMILCO ("In the Flower-field").
Xochitl = flower, *milli* = cultivated ground, *co* = in.

MODERN POTTERY.—I.

Whistles in the shape of Fowls and Cows—Four Jugs in the shape of Ducks, illustrating Degeneration of the Duck—Two Tripod Dishes for heating Food over a Charcoal Fire—Low Tripod Dish for grinding Chili.

CHAPTER II.

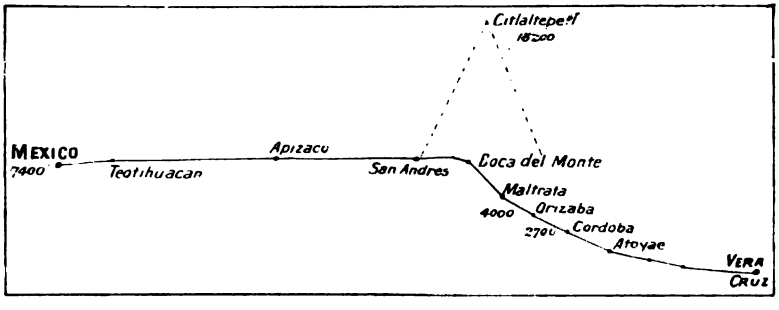
FROM THE HIGH TABLE-LAND TO THE ATLANTIC SLOPE.

The Scenery of the Central Plateau—Agaves and Pulque—The Edge of the Plateau; rapid change into the Tropics—Orizaba—Mexican Fruits: Bananas, Pineapples, Aguacate, Zapote.

The traveller who arrives in Mexico City from the north, after a long railway journey, say from El Paso, has an opportunity of seeing some 1,200 miles of the country; and not much less when his route is that by Laredo, or Eagle Pass. Yet, to begin with, there is not much to strike him as different between New Mexico and the State of Chihuahua, nor would he perceive much change between Texas and the adjoining Mexican States, whilst his general impression of the 1,000 miles ride is that of a dreary, sandy, arid, dusty, wind-swept table-land, without any trees, and with brown or yellow as the prevailing tints, the landscape unrelieved by rivers, bordered by low ranges of mountains which, in the far distance, change into dark blue sierras, the jagged outlines of which stand out sharply against the light blue sky in the thin atmosphere.

The air, owing to the considerable elevation, gradually rising from 3,000 to 7,000 or even 8,000 feet, would be exhilarating if it were not for the fine, gritty dust which creeps into and covers everything. The fierce heat of the sun, beating upon and reflected by the interminable plains, raises little eddies of sand, like a miniature storm, in the otherwise perfectly still air. Some of these eddies concentrate into tiny cones rising only a few inches, others reach the height of a yard; there is a swirling, circular, gradually increasing motion, the sand and dry grass rush towards it from an ever-widening

circle, and suddenly, before we are conscious of what is going on or how it was done, there is a dark brown cone, composed of dust, sand, straw, leaves, and anything that is light and portable, many yards high; then the top broadens out into an inverted cone, and the whole "sand-spout" waltzes away, gathering force and substance in its maddening career across the plain. Then something happens to upset the equilibrium of this weird thing; maybe it stumbles over an obstacle on the ground in the shape of a boulder or a mound, or a gully, or the internal strain has become too great. At all events, the "spout" appears to snap asunder at its waist, the bottom cone collapses, and the top cone lingers on high up in the air like a



PROFILE FROM MEXICO CITY TO VERA CRUZ.

dissolving cloud. Sometimes there are many dozens of such fantastic apparitions racing over the plain. Result: dust, dust, and more dust, falling many miles away from its native home out of an apparently clear sky, which, however, causes every distant object to be bathed in beautifully delicate tints of violet varying to red or yellow. Very artistically, though in the long run very annoyingly, every blade of grass, and every leaf is coated with a fine film of whitish, sandy dust, or perhaps with some alkaline matter, where the local depressions are the beds of former lakes. The presence of a mob of cattle or a large troop of horses is indicated by a cloud above them. The vegetation is scanty: weird-looking Yucca trees, with here and there small-leaved mesquite scrub, sage bushes, agaves and cactuses of many varieties, and fields of Indian

corn, very desolate-looking with thin stalks and withered leaves.

The whole aspect changes to a great extent, so far as colour is concerned, when soon after the onset of the rainy season the ground is covered, scantily it may be, with the new grass, or when extensive patches of wheat and Indian corn are grown; but this applies only to a short period of the year, and in many

SAND, SUN, AND CHILDREN.

parts of the plateau the rainy days are few. When it does rain it comes down in torrents, as, for instance, at Saltillo one August day, when there fell 5½ inches out of an annual allowance of less than 2 feet. Most of these sudden floods run to waste in an inconceivably short time. Every shallow depression is turned into a lake, which empties itself without delay into the dry river-beds, causing the rivers to rise suddenly,

working havoc, though by the following day they have run dry again. We suffered days of delay by such cloud-bursts on our homeward journey.

The habitations are wretched shanties built of adobe, or sun-dried brick, clustering near the stations, untidy, cheerless, and without so much as a tree to give shade or break the monotony.

This is the general impression produced by the "mesa central" (central plateau) on the first morning of entering the country; the same in the evening, and again during the whole of the next day. More than a thousand miles further on there is still the same sandy picture.

Let us now take train by the Mexican Railway to Vera Cruz. The train leaves the capital at 7 a.m. It skirts the dreary waste of Lake Texcoco; an hour later we catch a glimpse of the Pyramids of the Sun and Moon near Teotihuacan, but the journey is monotonous and unrelieved even by a sight of the snow-clad giants, Popocatepetl and Iztaccihuatl, to the southwards, since they are hidden in the clouds. The endless fields are under maguey cultivation, that kind of agave which yields the famous pulque. As far as the eye can see, there extend rows upon rows of these grey-green plants, and as the train passes by them hour after hour, these rows begin slowly to spin round and round in the well-known delusive fashion. We pass the small station of Apam—a significant name, "aapam" in Aztec meaning "waterless land," or rather, a terrain which is dry on the surface with moisture beneath. It is this shaley limestone terrain, in the vicinity of higher hills, which is the best for the cultivation of the maguey plant, and as we happen to pass through the very centre of the pulque district, we may as well devote a little space to that industry.

THE AGAVE AND PULQUE.

There are about one hundred and twenty-five species of the Agave, an exclusively American genus, and one of the most useful of plants, which, in the barren districts, supplies well-nigh everything required by man. The juice makes various kinds of drink; from the root a starchy food is prepared;

the fibres are used for ropes, coarse and finely woven cloth—even paper, on which the Aztecs and other Mexican tribes wrote and painted; its huge dried leaves are used to thatch the miserable adobe huts; its woody stem and roots supply the only available firewood; and the rows of the plant itself form an impenetrable fence of barbed leaves that nothing can charge against. The flowering plant is a sight not easily forgotten, but it takes many years before it is ready for blossoming: fancy says one hundred years—hence the name "century plant" given to some of the largest kinds, *e.g.*, the *Agave americana*. Then during a single rainy season there grows out of the centre a stalk, or rather something resembling a telegraph pole, apparently leafless, but in reality furnished with insignificant, aborted, paper-like leaves. This stem often reaches a height of twenty feet, and a foot in thickness at the base. The upper third carries one of the greatest inflorescences known. About two or three dozen branches form a pyramid, with candelabrum-like branches, each branch carrying a disc composed of hundreds of yellow or orange flowers, which at a distance looks like a sunflower, the pyramid consisting of several dozen of such sunflower discs. When the thousands of seeds are ripe, not only the huge stalk, but also the whole plant, withers away and dies, without an exception, and without any hope of resurrection by means of new shoots or suckers. The Portuguese appropriately call this plant the "filha mata mai," "the daughter which kills her mother." Therefore, if the plant is intended to be saved for any purpose, *e.g.*, for hedging, it is necessary to cut down the rising flower-stalk without remorse.

Various drinks are made from the agave juice. "Mescal" is a distilled product from the leaves and the root, colourless, with a bitter taste and peculiar aroma, both of which it takes some time to appreciate. It contains as much as 20 per cent. of alcohol; the most celebrated brand is that of Tequila, north of Guadalajara, where a cask of 65 litros, or about fourteen gallons, costs 19 pesos. The national drink on the plateau of the tierra fria, is the famous pulque, a fermented product of the maguey plant, or *Agave americana*, which forms

the chief industry of the States of Mexico, Tlaxcala, Puebla, and Hidalgo. The plants thrive best on the arid slopes of limestone hills, or on the accumulated *débris* of such calcareous formations which is apparently quite dry on the surface, but retaining moisture beneath. The young plants are propagated from suckers, never from the seeds. In their third year they are planted in rows in the fields, an acre holding on an average 500 plants, so that a recently prepared field looks hopeless enough, resembling a quarry rather than a juice-producing plantation.

A VENDOR OF PULQUE JUGS.

Instead of a spade the labourer has a crowbar, with which he excavates a large hole in the ground, which is then filled with good soil to receive the plant, and this for many weeks looks more dead than alive. It takes six to eight years to mature, to be large enough for tapping. At the base of the central cluster of leaves, which are firmly closed together in the shape of a large pointed cone, a cavity is scooped, which in large plants is of the size of a man's head. In this the juice collects at the rate of half a gallon per week, and this process lasts for four or five months, when the plant is exhausted from the incessant loss, and injury done to its growing centre, and

dies. Consequently, the average yield of a good plant may be put down in round figures at ten gallons.

The "peon," or workman, has a pigskin on his back, and is provided with a long flask-shaped gourd, open at both ends, called "acojote." If the maguey is large, he climbs up into it, and, inserting the narrow end of the flask into the bowl, sucks at the other end, which is broader and furnished with a horn tube; the sucked-up fluid is emptied into his bag, and this in turn is poured into larger bags carried by a mule. When his daily visit is finished, the juice is conveyed to the hacienda, or factory, and put into wooden tubs or vats. In the fresh state this juice, called "agua miel," or honey-water, is sweet, with a slightly bitter taste, quite transparent, with a greenish tinge, and is a pleasant, refreshing drink. Very soon, however, fermentation sets in, occasionally helped, when there is a cold spell, by the addition of a little "madre pulque," *i.e.*, some already fermenting liquor. Within a few hours, through the fermentation, the sugar is converted into carbonic acid and alcohol, and the "agua miel," assuming a slightly milky appearance, becomes "pulque dulce," or sweet pulque, now a slightly intoxicating, but most pleasant, drink, although, owing to the gas, it causes a sharp, burning sensation to the lips.

If it stopped at this stage all would be well, and pulque would form a drink far more famous than cider, but unfortunately the fermentation proceeds so rapidly that it would turn the fluid into vinegar within twenty-four hours. In fact, "pulque dulce" cannot be exported; it has to be drunk on the spot or within a radius thereof, well within a day's journey. The natives have set themselves to cope with this difficulty with unwonted energy. Now comes the disagreeable side of the story. To check further fermentation an equal amount of milk is added to the "pulque dulce," together with an infusion of rennet, just enough, or rather just not enough, to coagulate the milk. The amount of rennet, the state of the previous fermentation, the prevailing temperature, and the cleanliness of the operator, are highly important factors in the process, which requires great skill and experience. They either

make or mar the pulque. The mixing takes place in a large vat or "tinacal," whence the pulque is transferred into pigskins, or barrels, and every day special pulque trains take this nauseous stuff into Mexico City. Nauseous to the greatest degree it is, because the rennet, a well-known part of the cow's compound stomach, is partly putrid. Maybe the milk also becomes slightly putrefied; at any rate it stinks horribly, worse than the strongest kinds of cheese. The pulque smells, the barrel or pigskin smells, the entire pulque-shop smells, and the drinkers smell—sour, putrid, alcoholic. Most of the acts of violence committed in the capital, at Puebla, and other large towns, are due to the prevailing drunkenness from pulque, which fortunately does not keep at all in the tierra caliente, and is essentially a drink of the cool upland countries. It would be interesting to know when and by whom this milk pulque was invented. The old Aztecs got drunk on "pulque dulce," as being without cattle, horses and donkeys, they of course had no milk.

The annual production of pulque amounts to something fabulous, and since none of it is exported except a small quantity in the shape of "pulque whisky," and since the drinkers are practically restricted to the males of the lower classes in the uplands, the effect may be imagined.

* * * *

We continue our journey until, by noon, Esperanza is reached. More than 150 miles, almost in a due easterly direction, have we travelled at a high level, which has varied but little from 7,500 to 8,000 feet, and as yet there is no change, no new impressions worth recording. But wait a few minutes longer. At Esperanza a new engine takes charge of the train; it is indeed a monster, one of those double-headed locomotives that looks like two engines joined end to end, built especially for very mountainous country. Four miles further east we arrive at Boca del Monte, the "gape" of the mountain, still at an elevation of 7,924 feet, but literally upon the very verge of a precipice. We are now at the eastern edge of the plateau, and this edge happens to be one of the most sharply defined

lines of demarcation, both with respect to the faunas and floras in the whole of North and South America.

An endless panorama now stretches out before us, and we look towards the east across wooded mountains, hills, ravines, and meadows till we see in the far distance, lost in a shimmering haze, the lowlands of the tierra caliente—the tropics. Within a few minutes the train descends by zigzags through a big ravine, amongst green patches of grass, pines and oaks, with tree-ferns and maidenhair, orchids and evergreens in profusion ; the rivulets soon take the form of cascades, and the air, hitherto decidedly chilly and crisp, becomes moist and warm ; Indians (among them a bright-eyed girl) flock round the train at the station, with offerings of fruit, unknown flowers, and pure mountain water, instead of the nauseous pulque. Ten minutes later, at the next station lower down, we are surprised at being offered the same things by the same girl. It is indeed the very same bright-eyed maiden that we saw before, and here are squatting the very same set of Indians with the identical set of calabashes, baskets, and jars that we noticed above. They have run helter-skelter down a short cut whilst the train was cautiously feeling its way down by a long detour. We are at Maltrata, distant from Boca del Monte only 12½ miles, but 2,670 feet lower.

By half-past 2 p.m. we are at Orizaba, 4,000 feet below Esperanza, and at 4,000 feet elevation above the level of the sea. Orizaba is sub-tropical, of which more anon. For the next sixteen miles the train continues through beautiful mountain scenery along the Rio Blanco, which is crossed and recrossed by wonderful viaducts, through and over gorges, along precipices, through dense forest and flourishing plantations, till, at Cordoba, at an altitude of only 2,700 feet, we are unmistakably in the tropics. This fact soon becomes apparent from the heat, the palm-thatch of the open-built houses, the more thinly-clad natives, the large bouquets of hot-house flowers, notably fragrant gardenias and whole basketsful of orchids—a sight to delight the heart of the most inveterate orchid amateur, unless it sicken him with a sense of hopeless envy. More than seventy different kinds of these

flowers have been collected in this neighbourhood, the district round Cordoba and Orizaba being noted for the profusion and variety of its orchids and ferns. It is, moreover, the land of tree-ferns and tall palms. The same conditions prevail until. about another dozen miles further down, at Atoyac, the foot of the eastern sierra is reached, whence from an altitude of about 1,300 feet for the next fifty miles stretches the lowland belt, sloping gently down to the sea at Vera Cruz. This lowland belt, in about 20° north latitude, is truly unmitigated tropical country, or tierra caliente. It may be characterized as savannah, sandy soil with morasses, which are most numerous near the coast, grassy plains with palms, mimosas, and acacias, and here and there a huge ceiba, or bombax, tree, and with rich vegetation near the streams and swamps. In the dry season it is liable to be burnt up, and in the rainy season it is unhealthy.

From this cursory description of the journey from Mexico to Vera Cruz it may be gathered that within the short distance of less than 200 kilomètres, or 127 miles, every gradation of physical condition of country exists, from the sweltering, tropical swamps on the coast to the high and dry cool tableland.

Instead of catching fever, the west-bound traveller, after sweltering all night from Vera Cruz upwards, is more likely to awake at Mexico City with the homeliest of colds. But there are still other climes within easy reach, and examples of cold and arctic conditions are suggested by the peak of Orizaba, which reaches far aloft into the eternal ice and snow. Thus it comes to pass that in this wonderful country we can study all the climates of the world, and that within a horizontal distance of less than a hundred miles, or in vertical distance more than three miles. There are few parts of the world where this is possible.

We had fixed upon Orizaba as our base for the exploration of the southern slopes of the mountain. Humboldt, and others after him, went up from Jalapa, and by the Cofre del Perote, on the north-eastern side, whilst those who only wish to ascend the peak are now always taken up on the western

side, from San Andres, near Esperanza. This, undoubtedly the most practicable way, was that taken by Professor Heilprin* and by J. J. Scovell,† together with several other scientists.

Orizaba is a pretty town of some 40,000 inhabitants, amidst charming surroundings, in a richly watered and fertile valley. It is an old place which the Chichimecs, one of the Mexican tribes, significantly named Ahauializ-apan, *i.e.*, "joy in the

OLD MISSION CHURCH, NEAR ORIZABA.

water," "the river of delight"; but this was too much of a mouthful for the Spaniards, who soon turned it into the more euphonious Orizaba. There are several interesting churches besides the fine cathedral, with a pretty well-kept plaza, and the market-place alone is worth many a visit. Hundreds of

* "Proc. Am. Phil. Soc., Philadelphia" (1892), p. 4–22.

† "American Naturalist" (1892), p. 842–844; "Science" (1893), p. 253–257.

natives congregate in the market hall at their regular stalls, or squat in the streets with their fruit, flowers, vegetables, and other goods, whilst the invariable "zarape" of the men adds richness of colour to the scene.

Of genuine native make, of pure, good wool, which itself is either black, brown, or white, or dyed with genuine native colours, the zarape is practically indestructible, and its colours are absolutely fast. Moreover, for a long time the natural amount of fat in the wool renders these blankets waterproof. It speaks well for the taste of the people that none of the endless varieties of the in-woven patterns and many-coloured designs are ever ugly or jarring. Many of them are exquisitely beautiful. The designs seem to be as old as the native civilization, always geometrical, never with any figures of animals or plants. But, unfortunately, the white man's civilization, with its many fraudulent devices, has invaded this industry also. There are now large factories of zarapes—for instance, at Puebla—where they use "poor, or little, wool, but much aniline dye." However, some of these up-to-date fabrications are good enough, and can hold their own, except for the absence of the soft effects of the indigo and the cochineal; but many others are only fine-weather garments, as the first soaking rain causes the pattern to run, and stains the wearer's white cotton shirt and pantaloons. The sad point is the fact that not only these worthless "mantas," but also the better qualities are turned out cheaper than it is possible for the native artist to produce them, and thus they, too, are now forced to resort to aniline dyes, whilst the culture of cochineal and of indigo, both aboriginal products of the country, has almost died out within the last few years.

There are several hotels in the town, in the broad but partly unpaved Avenida de la Libertad, and these are good, bad, and very bad. At one of them we managed to fall out with the staff, owing to some unfortunate misunderstanding, and they then robbed us of a dress and all our newly-bought zarapes. This is, by the way, almost the only instance during all our travels when anything has been stolen from us in "thieving Mexico," although there was often ample opportunity. A pair of bathing

trousers, probably too strange an article to be left out for drying in the wilds of Oaxaca, and an earthern waterjug, worth twopence, and a lantern were "lifted" in Iguala. This, however, completes the list of our losses; and for the railways that carried for thousands of miles our dozens and dozens of packages, many of them quite unprotected, and left often for days at some wayside shanty of a station, no praise is adequate.

The town is healthy, lying on a slope between two rivers, as it is supplied with ample drinking water, and is still innocent of artificial drainage. It is therefore much resorted to, both as a summer and winter station, by the Vera Cruzanos who wish to escape from the sweltering heat, and in the winter by people from Puebla and the capital who want to get warm in this delightful climate, which much resembles that of a hot English summer.

With its altitude of 4,000 feet, it enjoyed for many years a reputation for immunity from yellow fever, and was therefore all the more sought after as a haven of refuge by the wealthy costaleños. Still, during the autumn of 1902 it suffered from a long-continued visitation of this "yellow peril," and thereby hangs a little tale. Hitherto, a kind of sanitary inspection had been made somewhere below Orizaba of the passengers who came up from the coast during the almost annual outbreaks of yellow fever, and though suspicious cases were not actually retained in hospital, they were practically quarantined by being prevented from leaving the lowland belt. Then came the discovery of the responsibility of the *Stegomyia* mosquito for the yellow fever, and it was pointed out triumphantly in the papers that these little terrors travelled, as they undoubtedly do, in the carriages right up to Mexico City. What, therefore, it was urged, was the good of annoying and dragging out healthy passengers whilst taking the real culprits unmolested to the capital? Consequently, the mild quarantine and inspection were discarded, and Orizaba got its plague, and was shunned by visitors, especially by tourists, since the town was put on the Black List of the U.S. sanitary officers.

The neighbourhood of the town is very rich in vegetation

and exceedingly pretty. The town gives the impression of great size, since one may walk for nearly an hour along any of the main roads without getting into the country; there are always houses on either side, first forming regular towny streets, then they become dirty, smaller, and more scattered, and the patchy pavement gives way to deep ruts, black mud and filth, with pigs wallowing in the pools, and with fowls, children, turkey buzzards, and ferocious dogs contesting the right of way. Then follow orchards, here and there with an abject-looking, dirty, untidy hut near the lane. In reality, all the space between the radiating streets and lanes is taken up with orchards, gardens, and plantations of coffee and bananas, the juicy, aromatic fruit, "chirimoya," of the *Anona* tree, and "aguacates." Here and there rises a majestic royal palm; Yuccas fence in the homesteads, and the red *hibiscus* blossoms glow in the dark foliage, together with the large white trumpet-like flowers of *Datura* trees, which yield a delicious odour, almost too powerful to be pleasant during the night, but eagerly sought after by the big moths.

SOME MEXICAN FRUITS.

EVEN a short stay in the delightful district of Orizaba cannot fail to impress the visitor with the great abundance and variety of Mexican fruit, nearly all of which he can see here growing wild or under cultivation.

Bananas flourish from the coast up to a height of 5,000 feet; beyond this elevation the fruit does not ripen well. They are entirely propagated by suckers, which are planted at the beginning of the rainy season, and grow so rapidly that they produce their one enormous bunch of fruit in about twelve months; consequently they are in season during the rainy period, summer and autumn. In the moist tropics ripe fruit is to be had all the year round. Although the plants grow as freely as weeds, they require a considerable amount of cultivation to yield good fruit. When the tall flowering-stalk shoots up, several suckers also sprout up, all but one of which are cut off. None of these need be wasted, since they can be used

for starting new plants. From the remaining sucker the second year's flowering plant is produced, which, as a rule, gives a greater bunch, and so forth for a period of several years. The greatest part of the labour is the keeping of the land free from weeds, not a small undertaking where Nature is so prolific, and starts a veritable tangle of undergrowth within a few weeks.

The banana plant grows most luxuriantly in rich humus, with an ample, but well-drained, water-supply. Therefore, whenever possible, the plantation is irrigated. In the tropical parts of the country they are used for a kind of rotation of crops in combination with coffee and cocoa, because these plants for several years, while young, require shade, until they are strong and dense enough to provide it for themselves. Until this is the case, and the young trees yield a crop of "beans," the bananas pay for the initial outlay, and avoid as well the considerable expense of keeping the plantation free from weeds.

There is apparently an endless number of varieties of bananas and "plantanos," most of them possessing different names, and as difficult to distinguish as are our various kinds of apples and pears. If one applies the wrong name to any one kind of the heaps of fruit spread out in the market, the woman will simply shake her finger and say "No hay." Some are red, or reddish, others yellow; some only reach the size of one's finger, while other kinds are veritable monsters, some being more than a foot in length and nearly three inches thick. The natives are most particular about eating them only when thoroughly ripe, because of the well-known harmful qualities of the unripe fruit, a fact not to be trifled with in a tropical climate. Unfortunately, the ripe banana or plantain does not keep, and the exported article conveys but a weak idea of the delicious sweetness and flavour of the genuine article when it has been allowed to ripen at its own proper time in heat and sunshine. When roasted, or baked in the skin, the flavour comes out more strongly, even in the unripe fruit, which, moreover, can thus be eaten with impunity. In some parts of the country a kind of banana-wine is made by fermentation

of the crushed pulp mixed with water, a drink not to be recommended, except, perhaps, as an aperient.

The banana is now a barren fruit; it contains no seeds, or, at least, they have degenerated into tiny vestiges of seeds which are attached to the grey central string which runs lengthwise through the fruit; consequently, the plant can only be reproduced by suckers. This is a very remarkable thing. The striking-looking flower, delicately mauve or pink, is there, with stamens and pistils complete, but the fruit is barren. There are still some species in the tropics of Asia which reproduce themselves by seeds;* but the best edible kind, the *Musa paradisiaca*, has never been known to do this, and, what is more, all knowledge of its original home is lost—hence its specific name. It has been from time immemorial propagated by roots only, and has consequently lost the sexual mode of reproduction. It is not even known whether the plant was indigenous in America.

Whilst it seems at least reasonably possible that through long disuse of the seeds the plant has acquired this negative feature, it is strange that it should have acquired no power to protect its long and beautiful leaves from the wind. These are invariably torn, rent, or frayed out at the edges, and there is scarcely a fully developed leaf, except in very sheltered places, which is not thus maimed; moreover, in many cases the shredding is produced by a minute insect which devours the green pulpy part of the leaf between the side ribs. It does not seem natural that such a large and important organ should not be built so as to be free from these incessant injuries, and, what is more, all the allied genera and species seem to suffer alike, even, judging by photographs, the gigantic "ravenala" of Madagascar.

The pineapple (*Ananas sativa*), or "piña," which is indigenous to Central America, also grows wild in the tropical parts of Mexico. It had been much improved by cultivation

* Mr. W. Skeat informs me that, in some parts of the Malay Peninsula, bananas are eaten which have seeds as large as, and as hard as, cherry-stones, almost sufficient to break one's teeth. Artificial selection and cultivation of the more preferable varieties has, no doubt, aided in producing softer and, ultimately, seedless fruits.

long before the Spaniards arrived in the country. The finest specimens—regular giants, a foot long—are grown on several large haciendas, or factories, south of Cordoba, and these fetch a high price in the capital, frequently more than a peso each. Those of ordinary size and quality cost at the market of Orizaba seventeen centavos, and fifteen centavos is about the average price in districts where the pine is native, although we often got them for nine centavos in Guerrero, though these were sometimes small and of poor quality. Of all the tropical fruits, the piña is the queen. It has the inestimable advantage of going, or rather agreeing, with any reasonable kind of beverage—coffee, tea, red or white wine, and water. There is nothing more delicious than the selection and eating of a piña before breakfast; it is most refreshing, and lasts long enough to make the unavoidable waiting for this meal more endurable. The crushed pulp mixed with water ferments easily, and makes a pleasant drink; but it is rather sweet and too full of body, and one's enjoyment of pineapple-wine is rather marred by the opaque, honey-brown look of the fluid, especially if it should be ladled out of an insect-beset jar with a cocoanut shell. Most of the fibres of the bromelia-like plants are strong; those of the pineapple leaves are especially strong and fine, and are much used for the making of anything which elsewhere is made of hemp, such as hammocks, ropes, thread, and paper bags. It takes about a year for a plant to produce its single ripe fruit from the time it is planted as a sucker.

The "aguacate," the fruit of the *Persea gratissima*, a tree belonging to the laurel family, makes a delicious salad with the addition of oil, vinegar, and salt; it is a buttery, mealy, oval-shaped fruit, some three to four inches long, with a smooth skin, varying from green to black, and a large stone. Its Aztec name, "ahuacatl," has been, and is being, distorted beyond recognition, and popular etymology has here been rampant. It has nothing to do with "agua"; some spell it "abogado," *i.e.*, "advocate," and the Americans have turned this into "alligator pear." To cap these names we called them "watercats." The tree which bears this frequently mis-

named fruit flourishes up to an elevation of 7,000 feet, and is indigenous.

"Zapote" fruit are sold in any market, but the buying of them is likely to lead to misunderstandings and a trial of temper, since the Nahoa term, "tsapotl," applies to almost any kind of fruit which is succulent, and has but a few large and hard seeds. The English language has no simple equivalent term for it. We have come across at least five very different kinds of edible fruit, all of which are locally sold as "zapote," although they each have a distinguishing name.

There is, first, the "chico-zapote" (*Achras sapota*), the only representative of its genus, indigenous to tropical and semi-tropical America, distantly related to *Erica* and *Arbutus*, and forming with these and others the order *Sclerophyllæ*. The tree is rather handsome, growing to a height of forty feet, with very hard wood, and dark and leathery evergreen leaves; but the flowers are insignificant, light-brown and whitish in colour, and with a faint scent, reminding one of old bronze or copper coins. Every part of the tree yields a sticky white and very astringent, bitter juice, from which chewing-gum is extracted by some process of distillation. If prepared over a wood fire the smoke colours the gum blackish-brown, and this kind some of the native tribes—for instance, the Mazatecas—are very fond of chewing. This stuff is called "chicla," from the Nahoa "tzictli," a most appropriate word, in view of the incessant noise made by the chewer. It has caused the tree and fruit to be distinguished as "chico-zapote," which has therefore nothing to do with "chico," meaning small. The fruit is of the size of a small potato, which it much resembles in appearance, owing to its shape and light brown, slightly rough skin. Its flesh contains some five smooth black kernels, and has a most agreeably sweet and aromatic taste. It can be eaten only on the day of its being completely ripe, as until then the milk of the fruit is bitter and astringent. On the following day it begins to decompose, and as it does not ripen well when plucked green, it cannot be exported.

A near relation of the above is the "zapote borracho," or "amarillo," the *Lucuma salicifolia*. This tree is apparently

not cultivated. It is called the amarillo or yellow zapote on account of the colour of its flesh; in an occasional variety this is, however, dark red, of the colour of claret, and in Spanish such a colour is called "borracho," but this word also, or rather usually, means tipsy, or a drunkard, and, curiously enough, the kernels of this fruit certainly produce a narcotic effect.

Other members of the same order, but of the family *Ebenaceæ*, belong to the genus *Diospyros*, *e.g.*, *D. obtusifolia*, and they are distinguished as "zapote prieto," or "negro." Such "black fruit" occurs in several varieties—for instance, near Tetela—and some are said to be cultivated. Our Mateo did not seem to think much of them; perhaps they were not in season, and we left them alone.

Then there is the "zapote blanco" (*Casimiroa edulis*), a member of the orange tribe, though tree, flower, leaf, and fruit look very much like those of the *Achras*. The leaves stand mostly in fives at the end of the branches, while the flowers come out upon the sides of the twigs, upon a short stalk, with five petals and stamens, and the same number of flattened seeds in the agreeable fruit. This tree has a wide distribution in Mexico, from the "hot-lands" to the plateau. The Aztecs call it "iztac zapote," the white zapote, and also "cochi zapote," which is said to mean somniferous, practically the same as the "zapote borracho."

Lastly, there is the "zapote mamey" (*Mammea americana*), the mammee fruit, of the order *Guttiferæ*. This noble tree has been introduced from the West Indies, and is now frequently grown in the warmer parts of Mexico. It is a large tree, often sixty feet high, with large laurel-shaped leaves, and a sweet-scented white flower an inch and a half in width. The large globular fruit, sometimes of the size of a man's head, contains four large, rough-surfaced brown stones embedded in the flesh, which is either yellow or reddish; the outside of the fruit is of a warm reddish-brown, and looks like plush or soft leather. After we had eaten it at a factory, or hacienda, where it was cultivated, we were delighted to find the same inviting-looking fruit growing in the forest near by, and with much trouble secured some specimens, with the help of a most unwilling

native, who, no doubt, thought us mad, and as events turned out, quite rightly, since it was not a mamey but a good imitation of it—the terribly astringent and poisonous "frutillo."

HIEROGLYPH—ORIZABA.
Ahuiliz-apan = "Joyful River."

CHAPTER III.

CAMPING ON CITLALTEPETL.

Scenery near Orizaba—Vegetation at the Level of the Cloud-belt—First Camp at 8,600 feet elevation—Visitors—The Forest and its Fauna—Armadilloes—Lungless Newts—Second Camp at 12,500 feet, above the Cloud-belt: different aspect of Fauna and Flora—The upper Tree-line—An Ascent to the Rim of the Crater.

The Orizabeños look upon the giant mountain as their own chief "sight," although it is at least twenty miles off. Its real name is Citlaltepetl, or Star-mountain; its Spanish title is "El Volcan de Orizaba," or the "Orizaba Volçano," but familiarly it is spoken of as "El Volcan," or "El Pico." Only its gleaming white crest is visible from the town, and the people speak of it as if it were a nice place for a picnic, though we could find nobody who had ever been near it.

However, we had the necessary recommendations from the Governor of the State to the Prefect of Orizaba, a courteous and sympathetic gentleman, and from him we obtained a letter to the village communities further up. Good horses, too, could be hired easily, and at a reasonable rate, in the town.

One brilliant morning, therefore, we rode out, lightly equipped, to scout for ourselves. A very good road leads northwards through Jesus Maria and La Perla, which latter lies near the foot of the Sierra proper; thence there went a mountain track through Tuzantla and Xometla, but as yet we had nowhere found anything like a suitable camping-ground, until we came to a perfectly ideal spot, at 8,600 feet elevation, sufficiently high up and far enough (about a dozen miles) from the town, to make a start with.

Well satisfied, we returned after nightfall to Orizaba. At Tuzantla we made some friends, and through Mateo's (our native servant's) quiet, persuasive ways, half a dozen mules and donkeys were bespoken, to come down and fetch our baggage on the following day. Great was our astonishment when they actually did appear, accompanied by

CITLALTEPETL FROM NEAR ORIZABA.

several bare-footed, roughly-clad "montañezes," or wild men of the mountains, as the shifty townspeople called them—in reality, simple-minded fellows who had come down because they trusted us.

Where the Rio Blanco rushes through a deep limestone gorge, the vegetation is of bewildering beauty. Large "alamos" (a kind of *Platanus*), with magnolias, crotons, and many kinds of oaks, are the prevalent trees, and wherever the big branch of a plane tree or an oak stretches out horizontally over the

stream in a shaded place, it supports a growth that would surpass the most luxuriant and tastefully-arranged hothouse fernery. The whole branch is thickly covered with moss; in the middle arises the scroll-like shoot of some bromelia, surrounded by a profusion of ferns, selaginellas, and orchids, festooned with lichens and lichen-like tillandsias. These

YUCCAS (*Liriodendron*) NEAR LA PERLA.

clusters are regular hot-beds of life, the decaying parts forming an ever-accumulating mass of humus, the refuge or hunting-ground of many kinds of little creatures. And all this beauty is reflected in a pool, whence arise the broad leaves of collocasias and other water-plants.

The gentle slopes towards the north are like pretty park landscape, with good pasture and clusters of shrubs or trees of mimosas and acacias, crotons, myrtles, yuccas, plane trees, and

bamboos. Here, too, is the upper limit of coffee and cotton. Near La Perla we saw the first tree-ferns, although on the moist eastern side they occur down to about 2,500 feet. La Perla, significantly called "the Pearl," because of its fine situation, agreeable climate, and great fertility, lies at the foot of the Sierra. Thence begins the ascent. Tree-ferns, together with bracken, are plentiful. A group on the spur of a hill at 6,300 feet forms the lowest outpost of the pine (*Pinus montezumæ*), while 300 feet higher, at Tuzantla, they begin to be plentiful, though the prevalent forest trees are still several kinds of oak. Next the maize-fields become scarce, the meadows greener, tree-ferns and datura trees disappear, and here, coinciding roughly with the level of the central plateau, a great change now comes over the flora, which, with few traces of sub-tropical plants, is that of a temperate, moist, and fertile mountain climate.

To a great extent this luxuriant growth coincides with the lower level of the usual cloud-belt. The prevalent winds come from the north-east, laden with moisture from the gulf; they cross the lowland, discharging tropical torrents upon it in the rainy season, but as they near the edge of the plateau they are arrested, and, although they do not discharge so much water in the form of torrents, the more frequently prolonged rains are much more effective. The enormous mass of the mountain exaggerates these conditions, and on most days of the year there is a belt of clouds on its north-eastern or southern sides, whilst the west is dry, and in the winter, during the dry season, the "nortes," or north winds, which suddenly rage over the gulf, veil the uplands of the State of Vera Cruz for many continuous days in a drizzling rain. Since these conditions are important for any real understanding of the climate of Southern Mexico, let us put it thus:—The hot air, saturated with moisture from the sea, travels inland (either as a north or east wind across Vera Cruz, or as a south-east wind across Guerrero), and then rises, causing the cool air from the mountain fringe of the plateau to rush underneath, and thus form the clouds which send down the torrential rains upon the low-lying coastlands. The rain begins near the coast and exhausts

itself whilst travelling inland, and long before dawn the tempest is over. As a rule, the whole of the forenoon is fine, except, perhaps, when, during the first onset of the rainy season, it happens to rain for several days and nights without interruption. The water rises at once from the warm soil during the morning in the form of vapour, the process being helped

THE CAMP NEAR XOMETLA.

by the heat of the sun, and the moisture travels further inland until it reaches the cooler regions of the mountains, when these districts, too, get their thunderstorm. This may happen at any hour between noon and late in the evening, according to the situation of the district. In normal seasons these storms, always accompanied by a magnificent display of thunder, are so regular that in many localities invitations to afternoon or evening parties are issued with the reminder "after the storm." It would, however, be erroneous to assume that they

are of daily occurrence ; on an average it rains during the wet season every other day from one to three hours in most districts. It is true that the wet season begins at the coast, where it lasts longest, and then gradually proceeds to the plateau, but there are many exceptions. Moreover, the greatest number of rainy days in a month need not at all coincide with the greatest amount of rainfall.

The ascent towards Xometla was rendered difficult by the rain. The prevalent soil, except on the limestone, was a kind of red ferruginous clay which extends almost down to Cordoba. The incessant rains, and the hauling over the track of planks and boards and other pieces of timber, had turned the track where the steep slopes occurred into veritable glissades, and it was late in the afternoon before the whole party assembled, drenched and muddy, at the camping ground. The place was ideal—a beautiful glade ; to the north-west loomed the glorious peak, though, unfortunately, it did rain during most of the nine days that we spent there.

The first few mornings were fine, and rain did not begin to fall till about noon, when it rained for an hour or two ; this was followed by a few minutes of sunshine, but for the rest of the afternoon and evening it came down in torrents. During the nights heavy, continuous thunder was heard from below in the tierra caliente ; in the daytime the thunder was above us, and it rained, except when all was wrapped in a thick mist or drizzle. This wetness, at an altitude of 8,600 feet, with a decidedly cool temperature was trying, and it was little consolation to be told by the natives that the wettest months here were July and August, when it rained every day, sometimes for a few hours, sometimes " todito el dia," *i.e.*, the whole little day long ; but that they hoped for a respite during " la canicula " —the dog-days.

Poor Mateo, saturated as he was with malarial germs, and having come up only a week ago from his home in the hot-lands, at once broke down with a severe attack of fever, brought on by the unwonted cold, and for a day and two nights he was the cause of much anxiety to us, until he was brought round again. To see his sallow appearance, the shaking and

the childlike helplessness, was an awe-inspiring sight and irresistible attraction for the hill-natives, who had heard of, but had never seen, a case of fever of this kind. Indeed, these hardy mountain-dwellers had not much sympathy with disease. "Here are no illnesses of any kind," said one, "but we know that the people down below are always ill. Here people die in their time" (which is certainly not long, to judge from the fact that we never saw a really old man or woman), "unless they meet with any accident."

Most of the few natives in the neighbourhood paid us a call to satisfy their curiosity, and they were of two types. The majority were rather short, broad-faced, and with prominent cheek-bones, short chin, and somewhat flat nose, the men without any trace of beard; the others, who were herdsmen, were taller, with sharp well-formed noses, good features, and a scanty growth of hair on the chin and upper lip. Such a fine fellow, for instance, was our friend, Francisco, of Tuzantla, and Hieronimo Alarcon, a wild-looking but most intelligent herdsman whom we named John-the-Baptist. He, together with his younger brother Ezekiel, knew the haunts and habits of every kind of creature in the neighbourhood, and was naturally soon induced to accept the post of chief collector, and almost daily brought something new. Some of the other men were also not averse to roam about in search of animals, or to give their quaint versions of the habits and properties of men, beasts, and plants; they minded neither wet nor fatigue, and willingly went and returned in an astonishingly short time the twelve miles to and from Orizaba to fetch provisions. This they did for scanty remuneration, half a peso here being much more than a full day's pay; but to attend to the camp for a few hours daily and regularly, to cut wood, and make up a good blazing fire, above all, to sit still with nothing to do but to guard the camp during our absence—at tasks like these the free sons of the mountain drew the line. Not one of them could stand this occupation for more than two or three days, and when any one of them had once got his ample pay he was certain not to show himself again, as he was then in the awkward position of having money without a chance of spending it.

The camp stood about half-an-hour's walk beyond Xometla, which being only a "cuadrilla"—*i.e.*, not a village, but only a few scattered hamlets—was ruled by a sub-regidor; the regidor, or presidente municipal, lived at La Perla. The few scattered habitations, which make up Xometla, are mere shanties, constructed roughly of boards, thatched with the bark of the "oyamel," or *Abies religiosa*. The floor is made

A HOUSE AT XOMETLA.

of stamped-down clay, with a fireplace on the ground, surrounded by implements for grinding maize—to wit, a three-legged, sloping "metlatl," or grinding-stone, made like the "metlapil," or grinder of lava-stone, and the thin, brittle, flat dish upon which the tortillas are roasted, with smaller, but otherwise similar, implements for grinding chili, some vessels of earthenware and cow-horns. Shelves are fitted up to hold the other household goods and the clothes, and the bedroom is

partitioned off with zarapes. It was all very clean and orderly. The good natural drainage, the opening in the pine-forest 8,000 feet up, the absence of cattle-yards, and of any intoxicants were not conducive to slovenliness and misery. The people were poor but contented. No grain was grown, but there were small fields of Indian corn and patches of potatoes, which latter were said to grow well. A kind of wood-sorrel is also cultivated, the fleshy root and lower part of the stem, which grows to more than a foot in height, being boiled in milk and eaten.

The staple industry is the burning of charcoal and the sawing of pine and deal boards, which are dragged down the steep slopes "travail" fashion, a couple being fastened to a pack-saddle. This method of wood-cutting implies a deplorable waste of timber, the greater part of the tree, comprising valuable logs of timber, being allowed to rot because they cannot be transported. Moreover, the people are utterly regardless of the consequences of a fire. Many a splendid pine tree along the path had had a hole burnt into it, and several times did we find one smouldering. The explanation was always that somebody had felt cold, and had re-lighted this primitive kind of wayside stove to warm himself. Then he had left the place to take care of itself. This does not matter much in the rainy season, and in mixed forest, but higher up in the region of the pine-forests whole slopes have been devastated by fire, especially since the herdsmen there are in the habit of firing the dried tussocks of grass to produce new crops. This is a difficult question to deal with. Theoretically, to burn the grass is strictly forbidden; moreover, most of the forest now belongs to a few rich owners, while the few village communities have grazing rights in it. The owners live in Orizaba. Is it likely that the sub-regidor of Xometla will punish the herdsmen for an illegal act, which is nevertheless hallowed by immemorial custom, and which, after all, benefits the cattle of his own community?

The sub-regidor was a man of pleasant manners; it amused him to have such queer strangers in his neighbourhood, and he did not like our leaving it for another camp higher up, since the official letter from the Prefect had made him

responsible for our safety, and "there are bad people higher up, lawless fellows, who will attempt to rob you, and this would lead to a row." We all had a good laugh when it came out that our friend John-the-Baptist was one of these "mala gente."

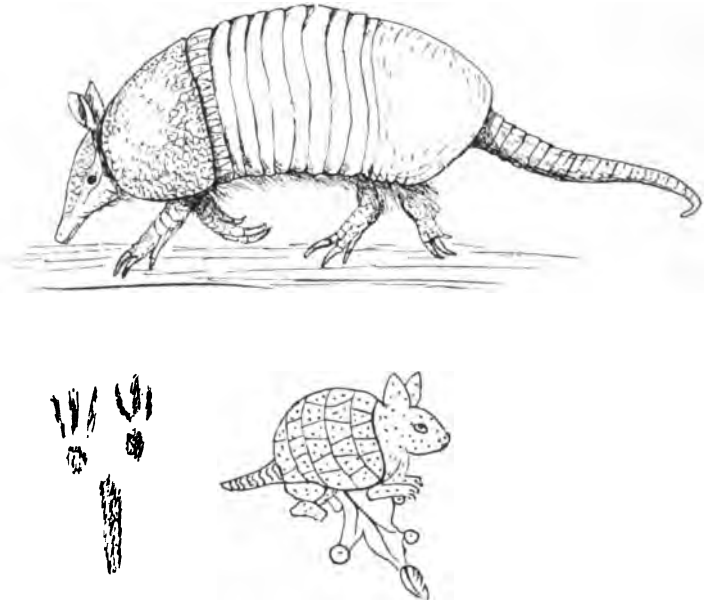
The sub-regidor took it for granted that we were heretics. "I know, all you foreigners are, that seems to be the custom in your country; but please tell me two things: First, what is the difference between our faith and yours? Secondly, would it be worth our while to adopt 'el protestantismo' if it should prove to be better?" He felt that he did not get much satisfaction out of his occasional attendance at mass at La Perla, and for a while it struck him that the absence of compulsory confession might be convenient, but when the broad general question was explained to him,he summed up splendidly, "No vale la pena, el Dios el mismo"—"It is not worth while, the God is the same."

The vegetation near the camp was grand. The forest consists mainly of the long-leaved *Pinus liophylla* and the "ocote," or *Pinus montezumæ*, which much resembles our Scotch fir, mixed with or rather bordered near the open spaces with various deciduous and evergreen oaks, "madroño" or arbutus trees, and alder, or *Alnus jorullensis*, called here "ilite verde." On open patches grew dense shrubby masses of the dark green small-leaved *Arbutus spinulosus*, a shrub with a pungent smell. *Fuchsia microphylla* forms shrubs twelve feet high. Plants of the bromelia kind occur in many varieties. On the ground, near the streams, they are more like typical bromelias, with long, serrated sharply-cutting leaves; others (*e.g.*, *Tillandsia tricolor*) form clusters on the "ocote" trees, looking as if the green leafy top of a pineapple had been grafted into the branch, with a long flower-stalk which, in the tillandsia, bears insignificant flowers, though the spathe carries bracts and short modified leaves varying from red to blue or yellow, these giving the whole plant an orchid-like appearance. These big tillandsias continue up to a level of 9,600 feet, when they suddenly disappear. Other kinds look like pendent lichens, or form little patches on the

branches, resembling tufts of short, withered grass. Orchids were also well represented, from the broad-leaved, white-flowering *Catasetum*, which grows in the mould-filled recesses of hollow oak-trees, to crimson red stiff-leaved kinds, growing high up on the pine-trees. Ferns in the forest itself and in the open are scanty, except bracken, but, on the mossy stems of rough-barked trees, such as the oak and alder, was polypody. In the deep, well-shaded water-courses plant-life was luxuriant: here were maidenhair and big ferns in masses; here, too, were thick clusters of bamboos, though not in such bewildering profusion as in the "barrancas," or gorges, lower down. The influence of the tropics was still indicated by gigantic lianas which crept right up into the tree-tops; one of these, a bignonia, appropriately nicknamed "el caballero," or "the rider," since, as the people explained, it is never seen on the ground, but is always "well mounted." Salvias, dahlias, begonias, geraniums, oxalis, fuchsias, tradescantias, thistles, irises, and *Ipomoea purga* with its long scarlet trumpets, would be the most likely components of the armful of flowers which may be gathered during a short ramble.

Animal life seems almost absent; especially striking was the scarcity of birds. We never heard an owl, nor did we see a single eagle, hawk, or falcon; a few families of tits, a tree-creeper, a woodpecker, and some *Cyanocitta nana*, or blue jays, were all we noticed; there were scarcely any butterflies, and there was no humming of insects; perhaps all winged insect life was depressed by the rain and mist. Of mammals we saw more: mouse-like rodents—*e.g.*, *Peromyscus*—we caught in traps; the "tuza," a kind of "pocket" gopher (*Geomys hispidus*), had its burrow not far below the camp, and was very common near Tuzantla, which name literally means "plenty of gopher." Squirrels, such as *Sciurus variegatus*, mostly grey or reddish, were frequent; but there was one interesting find, the occurrence of armadillos, which we had not expected at this level. It is true the same kind, *Dasypus novemcinctus*, inhabits also the Valley of Mexico, and is found, for instance, near Contreras at 8,000 feet elevation, but near our camp in a decidedly cool, clammy forest they seemed out of place. One of their

burrows stood at 9000 feet. They left plenty of spoor. When they are poking for worms and insects they make little holes resembling those of badgers, or scratch up some soil, pushing it back between the hind limbs, the latter, with the tail in the middle, leaving a curious-looking impression. A family is said to consist of six, including



ARMADILLO TROTTING. ITS IMPRINT. THE HIEROGLYPH.

Ayotochtli = Tortoise Rabbit. The sound "Ayotl" (Tortoise) is indicated in the hieroglyph by the sign "a" = water, represented by a wave with shells.

four young, all of which live together in one "nido," or nest, which, like a badger's burrow, is deeply hidden on a slope between rocks and the roots of trees. This same kind of "encubierto," or "armado" (in Aztec "ayotochtli," or tortoise-rabbit), thrives equally well in the tropical lowlands. Being nocturnal, spending most of its time in its burrow, and probably hibernating when times are bad, it seems more independent of temperature than most mammals, in

spite of its naked skin. In any case there are but few kinds of mammals, except certain carnivores, which can show such a great vertical range of distribution as 9,000 feet. The peccary is regularly exhibited at the cookshops of Orizaba, where also *Cariacus toltecanus* (a small deer with antlers more like those of a roebuck) is common, but owing to the presence of wood-cutters and charcoal-burners, they are now restricted to the higher regions. This scarcity of game implies the absence of carnivores, of which, at this altitude in Mexico, only the wolf, coyote, lynx, and puma were to be expected; the latter is not rare near Orizaba, which, broadly speaking, marks the lower distribution-level of this inhabitant of temperate and cool climates.

More to my purpose were the amphibia and reptiles. There were five kinds of *Spelerpes*, land-newts of slender build, mostly black with yellow or orange specks on the back, or dusted with grey. These prowl about in the dusk, and also during the night, in search of soft insects and small scolopenders, while some of them hide in the daytime under moss, or, with predilection, under the scraps of pine-bark which are strewn over the ground. Others, notably *S. orizabensis*, lead a partly aboreal life, their favourite hunting and hiding-places being in the clusters of epiphytic plants, such as tillandsias, orchids, and the climbing phyllodendron. Most, if not all, of them are viviparous, so that they are independent of standing or running water; moreover, these creatures, although they grow to a length of some six inches, either have no lungs, or but tiny vestiges of them, so that their whole respiration is carried on through the medium of their permanently moist skin, supplemented to a small extent by the throat,* which is occasionally worked vigorously. The tongue is also peculiar; it can be shot out upon their prey like that of the chameleon, although not so far.

The whole genus, which comprises about twenty species, is widely distributed, from Massachusetts right into north-western South America. At least ten species inhabit Mexico,

* Their buccal breathing has been studied by Inez L. Whipple; "Biological Bulletin," XI., No. 1, 1906.

nine of these south of a line drawn from Guadalajara to Tuxpan, on the Atlantic, a few as far south as Peru; one inhabits Hayti, and one (*S. fuscus*) lives in Sardinia and in northern Italy. In Mexico itself they have the greatest possible range of altitude. *S. orizabensis* I met with up to at least 12,500 feet on Citlaltepetl; *S. variegatus* from 9,000 feet down to the steaming hot lowlands of the isthmus. The occurrence of several species in the tierra caliente was rather surprising, as the finding of this genus in Peru has hitherto been explained by the tacit assumption of a former continuous range of high mountains. Here it may be mentioned that a whole boxful of *S. variegatus*, which I had collected on a day's excursion in a tropical district south of Cordoba, lived very well at our camps on Citlaltepetl in spite of the cold temperature; but all those which I brought from that mountain died within a few days when taken into the tropics. This observation corroborates the fact that most creatures can endure a temporary change into cooler surroundings, even although they may not flourish under it, while the reverse of such conditions prostrates and kills them. Amphibia are especially sensitive in this respect; a frog may be frozen, and on thawing it will revive, but a few extra degrees of heat, as, for instance, the warmth of one's hand, may kill it. Physiologically, all this is as easily explained—"the self-adjusting regulation of the body's temperature" is the phrase in technical use—as it is difficult to reconcile with what geographical distribution shows us. There are, in fact, many more species of animals and plants which have their original home, or probable centre of origin, in temperate climates, and now extend into the tropics and yet remain apparently unaltered, than there are hot-country species which have spread into cool climates. The latter process seems to require a much longer time to accomplish successfully.

The local name of the *Spelerpes* is "tlaconete," *i.e.*, little creature, from the Aztec "tlaco" = half, or small. They include *Thorius pennatulus*, a tiny newt, less than two inches in length and thinner than a match, with weak limbs and reduced digits. The lungs are also aborted; the nostrils of the males are very large and open, those of the females are

much smaller. These little things showed a predilection for living in a proverbially precarious position, namely, " between the bark and the wood " of decaying pine-trees, amongst the boring-dust of beetles and maggots.

Of tailless amphibians only one kind exists, but this is rather plentiful, *Hylodes rhodopis*, a small *Cystignathid*, which leads the life of a tree-frog. It seems to be a southerner, which, although not extending on to the plateau itself, ascends the high mountains on its eastern, southern, and western borders. On Citlaltepetl, for instance, it occurs well up to 10,000 feet, whilst it also inhabits the " hot-lands " in the State of Vera Cruz. Most of the specimens were dark brown, with reddish tints, and lived on or near the ground amongst the dark masses of rotten leaves ; others had made their home in the tillandsia clusters, or on the green shrubs at the edge of the forest ; these frogs were quite green, but when caught soon changed to reddish yellow, and ultimately assumed the natural coloration, which is also that of specimens preserved in spirit. None of these frogs in the forest itself, upon the ground, showed a trace of green. The genus *Hylodes* comprises the *H. martinicensis*, the " coqui " of the West Indies, which has become famous as the first frog known to lay a few large eggs only, from which within a few days the young are hatched, as almost perfect little frogs, they having hurried through the gilled and tailed tadpole stage in a diagrammatically precipitate fashion. Most kinds of *Hylodes* seem to go through such a " condensed " process of babyhood ; the eggs are laid in a foaming lather or spume wrapped between leaves. Suitable places upon the mountain, shady places with decaying leaves, were swarming with these little baby frogs, but our search for nests was without result, since the proper breeding season was already passed, and the adults kept quite mute. In any case, the presence of these peculiar frogs was significant, they, with the newts, being the sole representatives of amphibia. There were no other frogs or toads whatever, nor were any known to occur. Both toads and frogs require standing water in which to deposit their eggs, and there is no standing water anywhere near the Xometla level. The streams were quick-

running and very cold; some were fed by melting snow, or became rapid torrents when it rained, and for these reasons they contained no fish either.

The distribution of creatures here was somewhat puzzling, although the explanation may be simple enough when hit upon. If any information from natives can be relied on, it is that about the presence or absence of poisonous snakes. Now, near Orizaba there are plenty, rattlesnakes included.

EVENING CALLERS.

Here at Xometla—in fact, from the foot of the mountain at La Perla upwards—there were none whatever, but the herdsmen insisted upon the occurrence of "cascabeles," or rattlers, higher up, and they were quite right. The ordinary rattlers of the genus *Crotalus* are, as is well-known, not averse to northern climes, nor to high plateaus, but they shun moist forests, and, on the higher Mexican mountains, their place is taken by *Crotalus triseriatus*, a small, very viper-like species, with but a poor rattle. This little snake is found up to nearly 13,000 feet. Thus, owing to local circumstances, it has come

about that we here have a belt of country free from poisonous snakes, one kind not ascending, the other kind not descending far enough. Of harmless snakes only *Tropidonotus scalaris* was found, this being the representative of a typically northern genus.

The numerous varieties of lizard found in the warmer parts, and even in temperate Mexico, ceased at La Perla, only two genera, *Sceloporus* and *Gerrhonotus*, sending up a few species each. The beauty of all the *Sceloporus*, *S. formosus*, a denizen of the median belt of these mountain ranges, was left behind well below Xometla, where it basked upon the rocks, its beauty and vividness of colours vying with that of the flowers; the body, of a shining emerald green above, would now and then be raised upon its four limbs, thus rendering visible the blue-black sides of the belly, the broad bands of blue and black across the neck, and the throat gleaming with the richest and brightest orange. Maybe he was admired by his mate in her subdued, washed-out dress, if we may assume so much appreciation and perception of colour in these creatures. Thence, almost up to the snow-line, we met only with the small *S. microlepidotus* and *S. æneus*. The former, truly arboreal and coloured like bark, ascends in the morning with the sun right into the tree-tops, where it hunts for insects. This little lizard has the greatest possible vertical range, from the hot country of southern Oaxaca, only a few hundred feet above the level of the sea, to the upper tree-line of Citlaltepetl, at about 13,500 feet. The other, *S. æneus*, also sombre of colour, does not climb the trees beneath which it lives, but prefers the grassy ground, and is equally at home in the moist, cloud-wrapped pine-forests, and on the more barren, grassy larva-strewn slopes, extending almost up to the snow-line. Lastly, there were four kinds of *Gerrhonotus*, called "escorpiones," but known to be harmless, for a wonder! Suffice it to say here that the gem of the genus, *G. gramineus*, is delicately green above and lemon-yellow below. It is pre-eminently arboreal, ascending the highest trees in search of insects, and making its lair in the hollows of oaks, pines, and arbutus. The other kinds are grey or brown, and

do not climb, but prefer tussocks of grass near little streams. They are all viviparous, live on insects and worms, and are of a wonderfully gentle disposition, losing their shyness a few hours after having been caught and handled. They keep well in captivity, and shed their skin, fingers, eyelids and all, in one continuous piece, turning the whole shirt inside out, as do blind worms, to which, indeed, they are related.

BREAKING CAMP.

No doubt there are other kinds of vertebrates at this level, but after a week's search it became more and more difficult to come across, or even to hear of, anything new. The preservation of plants in the wet atmosphere was a sore trial, and, above all, we had more than enough of the mist and rain. We therefore decided to move out of the wet by ascending above it. When the necessary beasts of burden and men had been procured, through the sub-regidores of Xometla and

Tuzantla, the ascent was easy enough, as there was a regular track made by the woodcutters, which still further up, had been used in former days by the "neveros," who carried snow to Orizaba, until the railway superseded this primitive traffic with the importation of American ice. Towards 10,000 feet of altitude the general aspect of the flora shows a marked change. The big tillandsia disappears, and mistletoes (*Loranthus*), or "planta quebradora," the breaker-plant, take their place. The oaks are left behind, and for a while the tall "oyamel" (*Abies religiosa*), "madroña" or arbutus, and the alder become the dominant trees; the long-leaved pine gradually drops out, and the underwood is composed of "escoba" or broom, elder bushes, and various shrub and tree-like heaths. This elder, *Sambucus mexicanus*, is the ugliest shrub of the country, very brittle, with grey-green, willow-like leaves; its local name is "azumiatl," mentioned already by Hernandez as "xometl," or "arbol del sauco"; infusions from the leaves are much used, and the leaves, when put upon the head, are believed to cure headaches.

The ground is covered with asfodels, the first patches of which, when found, were still small and without flowering-stalks; a hundred feet higher on the same slope they occurred in masses, though not yet in bloom; another hundred feet higher and they were to be seen in their full beauty, together with thistles, bilberries, lupins, and pentstemons.

Here, on a ridge, presumably at 12,500 feet of elevation, we established our camp, under pine-trees, on a carpet of asfodels and tussock-grass, in full view of the peak, which now appeared of imposing dimensions. We called this camp Santa Barbara, since the place was known as La Barbara, "the wilderness." There was a little brook with ice-cold water, and we managed to build a substantial hut to serve as shelter for our retainers, who, however, promptly disappeared on the following morning, only our friend Hieronimo continuing his visits. It was delightful up there. To our unspeakable joy we heard and saw the daily thunderstorms far below us; we were indeed two or three thousand feet above those everlasting clouds. Certainly we experienced no rain, but snow

fell occasionally. Frequently the snowy peak collected a cap of clouds, a short thunderstorm raged above us, and then the whole mountain glittered in a sheet of white, right down to the camp, but this snow disappeared rapidly under the sun, and soon all was dry again. Of course it was cool up there, the thermometer usually wavering between 39° F. and 46° F.,

OUR SECOND CAMP AT 12,500 FEET.

reaching 15° C. (= 59° F.) at noon. We experienced no inconvenience from the rarefied atmosphere, so long as we were not in motion, or during the night, but a few steps taken uphill at once considerably increased the pulse, whilst the felling and dragging about of small trees was felt severely.

It was less lonely here than at the lower camp, since in the scantier wood it was easier to observe the few creatures that lived there. There were mice, all of new kinds, some squirrels,

and right up at the tree-line we found the shed antlers of a *Cariacus*, incontestable evidence of its existence at this extreme altitude. One or two blue-birds, *Sialis*, some *Dendroecas* and tits inspected the lichen-covered trees, and a few humming-birds—an unexpected sight—hovered around the flowers of the lupins, though we had not seen a "hummer" since Orizaba.

SOUTH-EAST VIEW OF THE "VOLCAN," FROM OUR SECOND CAMP.

A sensation we could have dispensed with was the discovery of rattlesnakes close to the tent; they preyed, of course, upon the mice which made a good living out of the seeds and grasses; but the existence of these snakes so close to the upper limit of life, in a climate cold even in the summer, and one implying a long term of hibernation, was certainly surprising. Brown "escorpiones," *Gerrhonotus antauges*, basked on the grass-tussocks, *Spelerpes orizabensis*, continued nearly up to the

tree limit, and the last to give out was the little brown *Sceloporus*. In the morning they were easily collected under the bark of trees, or under stones, stiff with the cold, and it took hours of sunshine before they felt fit for leaving their hiding-places.

At the camp the "ocote"-trees averaged fifty feet in height, all of them covered with lichens, especially with the pendent *Usnea*, and often supporting thick clumps of the yellow-brown mistletoe. Many of the trees were dead, or had fallen from stress of age and weather; others had been destroyed by fire. Above 13,000 feet the "ocotes" become rapidly smaller, and appear yet more weather-beaten. There they stand in natural scattered groups, sprinkled over the southern and western sides of the slopes, whilst the northern and eastern aspects are bare; the trees here only reach from some ten to fifteen feet in height, and then they cease to exist. These trees are, in fact, miniature "ocotes," with every sign of premature age, and have been stunted or dwarfed through adverse circumstances; but they do not dwindle to a mere nothing, nor do they grow in sprawling, lying-down, or creeping attitudes like the juniper bushes which extend still further up, almost to 14,000 feet, the tree-line here corresponding to an altitude of about 13,500 feet. It is an interesting problem. We do not know the effects of the various factors in the problem, as, for instance, the temperature, rarity and moisture of the air, the condition of the subsoil, and, still less, the combined effects of these. The difference between life and no life is, of course, absolute; within the zone of life some animals and plants are sufficiently capable of adaptation to exhibit every grade, from a flourishing to a struggling or even lingering condition, and it is but a few kinds of plants of which the tree-line is composed. Why do they not dwindle to a mere nothing, say into dwarf trees of the size of those produced by the Japanese? Because, up to a certain level, the bionomic conditions permit the life of the species, and a few feet higher they do not. Annual plants may, of course, in a favourable season, climb up higher and flourish, but perennials are inexorably bound to the line. No species can exist which enjoys but a partial life, without the chances of self-propagation. It is, after all, not more perplexing than the

fluctuation of the snow-line at any given hour, since near that line water must be either water or ice and snow. Upon some plants the unknown effects of the surrounding conditions are very sudden and mysterious. For instance, the *Tillandsia tricolor* disappears quite suddenly from the southern slopes at about 9,600 feet; the last specimens are just as large and flourishing as those lower down, whilst the conifers, upon which they grow, continue without the slightest change. The *Pinus liophylla* and the *Abies religiosa* cease at their upper level as very big trees. Each kind has its limits, and, for unknown reasons, whilst climbing up the mountain, none of these trees have changed into new races, sub-species, or species, maybe because the whole district is comparatively recent territory, a fact which is almost certain, since the higher regions are still covered with the sands, ashes, and lava of the last eruptions. Their disintegration has produced the red ferruginous clay which covers most of the slope down to Cordoba.

At the very tree-line, on the slope of a sheltering rock, we found a rather fine specimen of an obsidian knife, left behind there by its owner, perhaps, many hundreds of years ago. From thence upwards cinders and pumice-stone covered barren stretches of the mountain, while here and there, on more stony ground, grew patches of lupins, and yet a few tussocks, looking like pillows of moss, but composed of tiny white flowers. Even here there was animal life: a raven croaked overhead, and some finches twittered among the rocks, while lizards (*Scelopo-rus æneus*) hunted a tiny-winged grasshopper, or another, which was brightly coloured and wingless, and possessed of ridiculously small jumping powers; lastly, there were some spiders. Then came the solid volcanic rocks, quite barren except for lichens and patches of moss, and some 600 metres above the camp, at an altitude of about 14,400 feet, we reached what seemed to be permanent patches of snow.

The summit of the volcano towered another 4,000 feet above us, and it was obvious that the ascent could never be made on these precipitous south-eastern and southern sides. Soon after noon the peak collected clouds, and, suddenly, a hailstorm made things unpleasant. Whilst winding our

CITLALTEPETL WITH SIERRA NEGRA AT THE TREE-LINE, 13,600 FEET.

way back, everything below became enshrouded in a thick fog, and it was nearing sunset when the repeated tooting of a horn gave us at last the right direction. Thoughtful Mateo, feeling uneasy about our long absence, had sent Hieronimo to the rescue.

From the central mass of the volcano, which within historical times seems to have been extinct, run out several ridges, one nearly due east, another south-east, and a third due south-west, all more or less cleft and broken ; these consist of huge streams of lava, partly covered with pumice stone, ashes, and sand, which wind and water by turns have worn into intricate ravines. In the south-west, at about three to four miles from the centre, the horizon is bordered by the jagged masses of the Sierra Negra, which rises to a height of nearly 13,000 feet, and looks very imposing with its sheer, precipitous walls turned towards the volcano. This Sierra Negra consists of limestone, apparently of the same type as the hard blue stuff of the later cretaceous age, which passes in a broad belt close by Orizaba, and thence far to the south, along the confines of the States of Oaxaca and Vera Cruz.

We stopped three nights at La Barbara, and on the fourth day descended and enjoyed a kind of repetition-lesson of the distribution of plants as one after another made its appearance, until their very numbers became bewildering. Tired, drenched, and hungry, we looked in vain for a suitable camping-ground, but there was only one small level patch, which, on closer examination, proved to be the cemetery of La Perla, showing that the village was nearer than we expected. We claimed shelter in the " curato," the house intended for the occasional visits of the clergy.

The " alcalde " made a pompous speech, promised us every assistance, and wound up with the bombastic remark : " Here you may do as you like ; nobody has any power here but myself—and God." " That's splendid, then let us have some food." " Hay de todo," said he ; " but as it is already late, I doubt whether you can procure anything now, but to-morrow, whatever La Perla possesses, you may command." He accepted a cigarette, drank our health in a cup of " specimen " spirit,

CITLALTEPETL.—THE SOUTHERN SLOPE AT 12,500 FEET.

wished us good-night, and promised to see us "mañana." The foraging on the morrow was disappointing, nothing beyond bananas, tortillas, and "aguardiente" was to be had; requests for chickens, bread, meat, and eggs, always elicited the same answer: "No hay," varied by "Se acabo" ("it has come to an end"). What little we got to eat on the evening of the following day we had to fetch from Orizaba.

Our companion had in the meantime developed his worship of the peak into a regular cult, and the symptoms became so acute, when, in the midst of tropical heat and beauty, we again saw the peak, now fifty miles off, that the only chance of a cure was to tell him to go and shiver if he liked on the top. But since he actually accomplished the ascent, rarely undertaken, and still more rarely successfully carried out, the gist of his own account is here given:—

"From San Andres Station, reached by the up-train at 2 p.m., a mule-tram leads to the village of Chalchicomula, six miles distant. The mountain, as seen from the plateau, was no longer a solitary giant spreading his great knees upon the earth and bearing up the firmament on his head. No, the first impression from the plateau is that of a hill—a deformed, almost hunchbacked, and dusty-coloured hill—rising out of a level plain, and only marked out from his fellows by a cap of snow. Dust lies ankle-deep in the parched highways, and every now and then leaps up in a tall column that spins its course until it is scattered by the wind, which sweeps over the endless fields of maize and agave. As the mules jog along, the view gradually clears, and one can distinguish first—the foot-hills, thirsty-looking yellow sand, and pebbly pumice; next—the belt of dark green forest, and over that the beetling mass of porphyry, down the sides of which long, cloven tongues of snow seem to be straining to lick something they cannot quite reach. Quiet reigns in the streets of Chalchicomula, where, save for the trams, wheeled vehicles are unknown; and the place itself, beyond its propinquity to the volcano, possesses no particular claim on the attention of the world. There is a regulation plaza, with the usual circular fountain and stone seats, flanked on one side by the large unfinished church,

from the *façade* of which San Andreas, clad in a plaster kilt, faces the afternoon sun. On another side of the plaza stands the Hotel Siglo Veinte (the 'Twentieth Century'), in which, as the visitor is assured by a handbill posted in the train, are to be found 'Comodidad, aseo, moralidad, y orden.' More than comfort, cleanliness, morality, and order one could not ask for, so here I took a room; besides, it was the only inn. I next broached the subject of the ascent. Instead of making difficulties, the landlord forthwith sent a boy for one Juan Sanchez, who turned out to be a man of seventy-two, but still nimble upon his feet. For the sum of $13, plus one peso for fodder, he undertook to supply a horse, a mule, his own services, and that of two other men, and to take me to the top of the volcano and back. In two days, unless a storm came on, he thought that the thing could be done.

"Next morning we started at 7.30, the necessary equipment having been packed on to two 'burricas,' or she-asses, into which the promised mule had changed during the night. The peak was clear on this side, but its north-eastern face was banked with fleecy clouds. The road lies through open, rolling foothills, all cultivated and treeless as far as Barrio de San Francisco, a pulque-producing village. Along the side of the road are big white-flowering thistles, purple convolvulus, and *Arbutus spinulotus*; while in the neighbourhood grow the 'encino' and the Roble oaks, the short and long-leaved pine, alder, and a few 'sabinos,' or junipers. At 9.15 we entered the 'orilla del monte,' amongst a belt of pines. The behaviour of the tillandsias was as striking as it was on the Xometla side. The first was noticed at 9.30, two more at 9.45, four minutes later they were plentiful, although not growing with anything like the luxuriance they displayed at Xometla. Here was met the first big 'oyamel,' which henceforth became plentiful, growing in groves. At 10.15 appeared masses of dark purple asfodels, the tillandsias gave way, and big scrubs of pentstemon and lupins, called 'Flor de San Juan,' six to eight feet high, attracted attention beneath the 'oyamel,' which is here the predominating tree. At 10.35 the ascent, which so far had been gentle, became

steeper; the alder disappeared, the long-leaved pine seemed somewhat dwarfed, and was giving way to the short-leaved 'ocotél,' but the 'oyamel' continued, most of the trees festooned with *Usnea*, and some were nearly overpowered with lichens. At 11.25 we stopped for an hour amongst lupins, pentstemon, small tree-heath, and 'ocotél.' The path now takes advantage of a depression between two converging ridges, and leads straight up to the toothed notch which separates the peak from the Sierra Negra. At 12.55 we were at the edge of the timber, and crossing a broad saddle between the two mountains, with steppe-like vegetation and deathly silence, although, for that matter, all the way up there had been very few signs of animal life.

"At 1.45 we reached our day's destination, La Cueva, a roomy hole in the side of one of the rocky reefs which lead up to the snow. This one runs about north and south, and its eastern or weather face is clothed for some distance with large pines which, being here locally sheltered from the wind although not from the moisture, manage to thrive at this considerable level, the altitude of the cave being reputed to be 13,700 feet. The night before the ascent is always spent at this cave; a big fire was made at the mouth, and soon after sundown a light rain began to fall. The night was wretched and nobody slept, although in preparation for an early start we tried our best. The altitude produced a tight feeling round the head and a slightly squeamish sensation in the stomach. The old man got up every hour to tend the fire and to look at the weather, but came back each time with the discouraging report—'Esta pegando,' literally, 'It is pegging away.' At last, soon after midnight, he declared that things were 'limpiando,' 'clearing.' We warmed some food and gladly left the dismal cave a little before 3 a.m., the old man leading with a lantern. The sky was clear overhead, but it was a dark night, and the moon had already set.

"There is a trail along the base of the ridge, and soon we found ourselves walking over the light powdery snow which had fallen overnight, giving the dim outlines of the ridges a ghostly appearance, but in front the dark mass of the peak

loomed up unmistakably. The valley up which we were going gradually narrows into a pass, and at a moraine, about five miles from the cave, the real snow-line is reached. At 4.45, and perhaps at an altitude of some 15,000 feet, the horse and the donkey were taken back to the cave by the old man, and we three began the walk up, which, for about two-thirds of the way, consisted simply in placing one foot before the other on the rocks which lead in a straight line up to the summit, the only difficulty being the filling of the lungs. Day burst in all its glory, and as we gradually crept upward the plain from Cordoba to Puebla was clearly mapped out in all its wonderful colours. In the foreground was Maltrata, and above it the green steps of forest and open country which overhang Orizaba. Westward a long stretch of filmy plain, and in the far distance, sparkling like many-hued jewels in the sunlight, were Popocatepetl and Iztaccihuatl. We kept on steadily until, at 7.45, we reached a point where the rocks stopped. The top was in full view, and just above our heads was 'el pulpito,' an overhanging mass of rock.

"According to the younger of the two guides we should be on the 'pulpito' in a quarter of an hour, but the older guide was less sanguine, and said that it might take us an hour to get to the crater itself. Actually it took us three hours, and we went through the misery of thinking that we might not get there after all. The main reason was the state of the snow, which was very soft after last night's fall, and we were also delayed by a storm which sprang up rather suddenly. Every step had to be sliced out with the spade by the unfortunate Juan, and so we 'tacked' very slowly indeed up the steep slope. The 'pulpito,' which had seemed within our grasp, was blotted out by the dense white clouds, and we plodded on and on without seeming to get anywhere. Juan could dig no more, and the other man was not such a good hand with the spade. Almost every moment I expected to be told that we could go no further, when through a thin spot in the mist appeared for a moment the figure of a cross which marks the summit. Between it and us there was a patch of wet ground which the wind had swept bare of snow; from below this spot looked as if one could step

across it, but we had great difficulty in dragging limbs over it.

"The cross, which the men approached hat in hand at 10.45, stands on the edge of the crater, but the wind blew so fiercely and so cold that it was impossible to stay there, nor could we see anything except the jaws of a jagged chasm in which water was roaring. We found a sheltered place and sat down, in the vain hope of the storm passing. We had nothing

THE GUIDES NEAR THE TOP OF CITLALTEPETL, 18,200 FEET.

to drink, which was a bad mistake, and for the food we had not much appetite in our somewhat nauseous and rather sleepy condition.

"After waiting half-an-hour we started down, putting our feet in the same dug-out holes; but the snow was treacherous, and before long I went through a soft place, wrenching my knee.

loomed up ing serious, but enough to make me cast about for gradualsier means of descent. After some palavering, Juan and I rigged up a toboggan in the shape of a small zarape, and we slid down on it together, all the way down the snow, covering in a few minutes what had taken us hours to go up. At 12.50 we were at the foot of the snow, and thence it took two hours to the cave, where we arrived about 3 p.m., hungry, but still rather squeamish about eating. When, an hour later, we left the cave the peak was brilliantly clear ! "

CHAPTER IV.

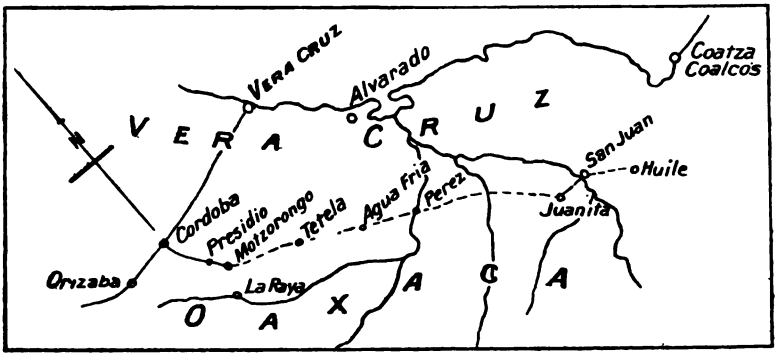
IN THE HEART OF THE TROPICS.

The Hill-forests from Cordoba to the Rio Tonto—Enormous Numbers of spawning Tree-frogs—Cordoba—A typical Hacienda—Native Boys as Collectors of Reptiles—Two Boas—The Ferryman Lizard—A shooting Fray—A Visit to the Mazateca Tribe—The Rio Tonto—Butterflies—Coral Snakes and "warning" Colours—Leaf-cutting Ants—A bad Accident—Lagoon Life.

Our original programme, as laid down at home, included a journey into the tierra caliente, the goal at which we intended to recuperate being Tehuantepec, and our plan being to reach the Isthmus by way of Oaxaca. We had even fixed the dates. In most cases, any serious change of such a plan of campaign leads to disappointment, to be repented at leisure, when it is too late. Not knowing how life in these tropics would suit us, we were a little afraid, especially after the many warnings received about the forests and swamps during the rainy season, and prudence dictated our leaving the sweltering, moist Atlantic lowlands alone, and trying the drier Pacific side, though in our heart of hearts we still hankered after the mysteries of the forbidden land. Eventually, however, we thought that we must have "just a peep" into those parts as well. On doing so, we were at once smitten with their luxuriant beauty, and good luck and a kind friend combined to produce a complete change of plan, which proved most successful.

The "peep" was instructive, and came about in this way. Whilst waiting at Orizaba for Mateo, we happened to befriend a queer fellow, who professed to be a collector of natural history specimens, and I spent an afternoon digging and hoeing

in his "cafetal," or coffee plantation, for newts, which, according to him, were so common that it would require care to avoid injuring them with the hoe. His name was Toro (Mr. Bull), a most inappropriate patronymic, since he was an arrant coward, childishly afraid of fever and snakes. What could be easier than to take the morning train for Cordoba at Orizaba; thence, after half-an-hour, to go by another train to Presidio, arriving at 10 a.m.; there to stop and have a look round, and to return by the up-train at 3 p.m., reaching Cordoba at 5 p.m.,



SKETCH MAP OF ROUTE FROM CORDOBA TO HUILE.

and getting back to Orizaba at 6.30 p.m.? What could be pleasanter and easier than such a picnic, the train service being scheduled so conveniently? What, indeed? Only that things and trains did not hit it off well.

The running of the Mexican Railway, from the capital to Vera Cruz, is above suspicion; but the other line was different. The wheels of the train creaked and screeched as the large American cars grated against the rails of the tortuous curves —now and then, indeed, they stuck fast, and then came a "wash-out," with a delay of several hours spent in mending the permanent way for the engine to be coaxed over the dangerous spot, hastily summoned Indians supporting the rails by means of crowbars used as levers. It was long after noon before the little station of Presidio was reached, with a flourishing

factory, or hacienda—the Finca de San Bernardino—in the neighbourhood. The owner, a Spaniard, was most hospitably inclined, and we much regretted that our stay would be so short, when the *up* train crawled into the station an hour before its time. But this was a false alarm, as it was the train that had been due on the previous afternoon. Of course, we let that train go, not knowing that the fact of its having succeeded in going up had been deemed sufficient reason for suppressing the normal train. But this was the fact, and we were let in for a twenty-four hours' picnic without any preparations.

What we saw and felt, heard and smelt, during that afternoon, the hot night, and the glorious morning that followed, as well as the ramble through forest and savannah, was enough to make us fall in love with the tierra caliente. The air thrilled with tropical life, in the literal sense of the word. Let me relate but one instance—*the* great experience of this hasty visit.

Whilst rambling along the edge of the forest we became conscious of a noise, at first resembling the mutter of a distant sawmill; but on our reaching the other side of a cluster of trees this sound grew into a roar, like that of steam escaping from many engines, mingled with the sharp and piercing scream of saws. It came from a meadow containing a shallow pool of rainwater. In the wet grass, on its stalks, and on the ground, hopped about hundreds of large green tree-frogs; nearer the pool they were to be seen in thousands, and in the water itself there were tens of thousands. Hopping, jumping, crawling, sliding, getting hold of each other, or sitting still. Most of them were *in amplexus*, and these couples were quiet, but the solitary males sat on their haunches and barked solemnly, with their resounding vocal bags protruding. Every now and then one was making for a mate, and often there were three or four hanging on to each other and rolling over. The din was so great that it was with difficulty that we caught the remarks that we shouted, although we were standing only a few feet apart. Each sweep of a butterfly net caught at least half-a-dozen frogs.

Now the grassy pool, where the frogs were closest, was about

thirty yards square (900 square yards), rather more than the area of a tennis lawn, and each square yard held from fifty to one hundred frogs—many square yards certainly held several hundreds each. At the very lowest computation this gives 45,000 frogs; and there was, besides, an outer ring of some five hundred square yards where frogs were fairly numerous, say from five to ten to the square yard, mostly spent females, but these few thousands we may leave out of the reckoning, to understate rather than overestimate the number. Supposing there were only 20,000 females, each spawning from 5,000 to 10,000 eggs—say only 5,000—the total would amount to just one hundred million eggs. The spawn literally covered both ground and water thickly. But the greatest surprise awaited us on the following morning, when we went to photograph the scene. There was not a single frog left: the water had all evaporated, and the whole place was glazed over with dried-up spawn! The prospective chance of millions of little frogs was gone, their expectant parents having been deceived in calculating their day of incarnation. That was on the 4th of July, several weeks after the beginning of the rather fitful rainy season.

These frogs belonged to the commonest kind—viz., *Hyla baudini*—found in tropical Mexico. We had already discovered half-a-dozen in the plantain-grove, tucked away and flattened between the sheath-like leaves and the stem; several weeks later I caught one or two on a branch which was overhanging a stream. With these few exceptions I did not again come across this species, which shows how easy it is to miss even a common creature, and how easy to infer its absence, when it nevertheless exists in that very district in countless numbers. These tree-frogs cannot have assembled from a great distance at that deceptive pool; they may possibly have represented but a fraction of the entire frog-population in the neighbourhood. It was, further, a surprising fact that no snakes or birds of any kind were to be seen in pursuit of them, perhaps because it is not the custom of the tree-snakes to hunt for them when thus occupied in the open, and they probably felt they could be sure of their prey at the proper time and place in the trees.

The railway which took us to Presidio goes from Cordoba to the Isthmus, where it joins the Tehuantepec line. Its official name is, or was, the "Vera Cruz al Pacifico," although it was not meant to extend to the Pacific, but was to have running power over the Isthmus line. It passes, roughly speaking, along the confines of the States of Vera Cruz and Oaxaca, going all the way through country practically unknown to the naturalist. It has since been repeatedly used by American zoologists. The line was advertised as the "Heart-of-the-Tropics-Route, one train each way daily, passing through wonderful valleys and picturesque plains, skirting the great sierras, passing all kinds of plantations, forests of palms and giant trees, the latter covered with orchids and tenanted by parrots and monkeys." All this is strictly true, only they forgot to warn the tourists that all along the two hundred and fifty odd miles from Cordoba to where the line loses itself in the wilderness, and during the four days which a successful down and up journey would take, there are only Indian villages and private haciendas, no inns, and no dining or sleeping cars. Of course not! The only way to enjoy such a trip would be as the guest of an inspection party in the owner's well-found private car. However, we managed even better than that, travelling not exactly in luxury (far from it), but in absolute freedom. By great good luck Mr. Algernon Joy, one of the magnates of the line, befriended us at Orizaba, and practically put the use of the entire line at our disposal. The sacred private car was, of course, out of the question, as it could not be spared for several weeks, nor was it the kind of thing one would conscientiously turn into a sort of travelling show or menagerie. I therefore pleaded for the next best thing, namely, a large goods van.

This proved in various ways better than a tent, since it solved the whole difficulty of transporting the equipment, without the ever-recurring worry of packing and unpacking it upon mules; it provided a shelter that was absolutely waterproof, and last, not least, it kept us and our belongings raised some five feet above the ground. When locked it could be left unguarded, as nobody was likely to run away with the car. Of

course, it had some drawbacks—for instance, it confined the stopping-places to stations possessing a shunting track, and it was naturally quite impossible to ascertain beforehand whether they would suit our purpose. Nevertheless, that particular car ("V. C. al P. No. 542") became our chief domicile and movable base. One end was curtained off by means of zarapes to form a bedroom, the centre served as drawing and reception-room, and the other end housed Mateo and our companion, together with a gradually increasing menagerie.

However, at Cordoba, the train service being uncertain in the morning and the car being not yet quite ready—it was recovering from the thorough cleaning which it had received—the night was spent at a wooden shanty close to the station, run by a Chinaman, who was "casado" (*lit.* "housed with," *i.e.*, "married") to an Indian woman. It was the usual abode of the railroad men and of occasional travellers, who literally fell into this hovel, the tiny "rooms" of which were formed by means of thin partitions, all giving upon the back-yard, over a mass of mud, dirt, and garbage of all sorts. But the woman was kind and attentive to my wife, and the food provided by the "Celestial" might have been worse—if only I had not been so rash as to interview him in the kitchen!

Cordoba, founded by and named after one of the viceroys, is a strikingly pretty and quaint town, situated just within the "hot-lands," upon a slight hill at an elevation of 2,700 feet. The soil is rich, with a considerable amount of black humus, which, combined with an annual rainfall varying from eight to nine feet, produces an incredible fertility, every kind of tropical fruit and flower growing here in profusion. Moreover, there is no really dry season, not a month with less than two inches of rain, but the wettest time of the year is from June to the end of September, with an average monthly allowance of from sixteen to twenty inches. The rainfall at Orizaba is very much less, being but six feet, and that of Vera Cruz four to five. The town lies a long way off the station, the tram passing first through a succession of orchards, and then through

narrow streets formed by picturesque, low houses, with eaves of curved tiles, which latter at times proffered a welcome shade, and at other times projected into the street, to right and left, thousands of little spouts of water. In the centre of the large plaza is a magnificent garden, and at least one of the hotels commands charming views.

CHURCH OF CORDOBA.

Our first stopping-place was Motzorongo, the name of a large hacienda. The administrator lodged and boarded us in the many-roomed house, Mateo remaining in the van, which became our laboratory. Motzorongo has an interesting history, typical of many such haciendas. Pacheco, a general of the Mexican army during the period of the foreign intervention, dealt the French a heavy blow at Puebla, and had the extremely

bad (or, perhaps, as it turned out, rather good) luck to lose an arm and a leg during the engagement. He thus became one of the national heroes, and, after the final expulsion of the enemy, General Diaz rewarded him with enormous grants of land, much or most of which land had, after the reforms under President Juarez, been confiscated from the numerous religious orders. Motzorongo was one of these grants. A house was built for Pacheco, and at great cost a factory with all the plant for the refining of sugar, and, to crown all, a railway was constructed from Cordoba to Motzorongo as its terminus, the beginning of the present " Ferro-carril de Vera Cruz al Pacifico." But the old warrior did not do well financially, and several times Diaz, who has never yet abandoned any of those who stood by him as comrades-in-arms during the bitter times of national stress, had to see him through his troubles. A huge ceiba tree (*Bombax ceiba*), now grown to beautiful proportions, was planted by the President during one of these sympathetic visits. Heavy mortgages had to be met when old Pacheco died, and the estate fell into utter ruin, the costly sugar factory plant with the rest. Then some foreign company bought it, and an administrator was employed to try and put it into shape again.

The land was originally taken away from the natives by the religious orders, and when these were disestablished, their bad titles were, of course, taken over as good titles by the new Pacheco concern, and the natives therefore still had to pay rent, in money, to Motzorongo. Those of Josefines and of La Raya, dependencies of the big place, had, moreover, to do " fronde " service, being obliged, for very small pay, to work two days per week. During Pacheco's patriarchal and easy-going reign this went on well enough, just as it had been doing for several hundred years, and his grave, not far from the house, was still visited by the natives, who wanted to perform certain heathen rites there. But the long interregnum following his death had utterly demoralised the natives, who became good-for-nothing loafers, and could only occasionally be induced to work for six or seven reales per day. After mid-week they turned up sixty or eighty strong, until they were paid on the

Saturday. On the Monday perhaps only three or four of them came, a few more on Tuesday, and so on, to the despair of the administrator, who never knew how many workers he was about to have available.

There was a large store, a shop stocked with every imaginable kind of goods that the natives might be induced to buy,

THE HERPETOLOGISTS OF MOTZORONGO.

from tinned meat to cigars, from milk to cognac, and from woollen blankets to machetes. Some of these machetes were of American, others of German make; both kinds were serviceable, but were not in great demand, for the simple reason that the pattern was not that which was fancied in that district. The various tribes are most particular about their machetes, not only as to the shape and proportions of the

blade, but also as to the shape and pattern of the handle, wherein immutable fashion reigns supreme. It was with some difficulty that we established trading relations with the people for collecting purposes. This new trade, however, proved profitable to the shop. I procured a handful of small coin to pay the boys with, and when, on the same evening, I went again for change, hoping that this might not incommode the storekeeper, he opened the locker and said cheerfully: "There they are, take them again; they will all come back to me." The boys had at once spent their earnings in sweets and other more necessary commodities, and thus these coins circulated rapidly.

Some labourers brought a pair of fine boa constrictors, which they had found ensconced in the ground while hoeing a field. Being gentle creatures, as all boas are, in contradistinction to pythons, they were taken to our car and put into a barrel. On the following morning both snakes were gone, but after much searching one was recaptured under the platform near the store, the other being reluctantly given up as lost. Several days later, my wife, overhauling the baggage, found the truant. It was easy enough, with patience, to recapture him, but my wife and I had our hands full with the creature, which would have been more than strong enough to break one's arm if allowed to coil round it, and thus get a purchase. The creature never lost its temper, but was most deliberate in its movements, and since we happened to be alone, to hold it was as much as we could do. But we were not rehearsing the Laocoon group; a passing boy, therefore, was invited to help us in putting the reptile into a box. "Como no?" "Why not," said he, and climbed into the van. But he was not prepared for another snake's head to shoot out when he raised the lid of the barrel, and only by dint of much forcible persuasion and patience were the boy and the snakes prevented from bolting. The worst of such little interludes is the utter exhaustion that supervenes in a country where every additional exertion causes streams of perspiration, and upsets one's mental balance. When one can loll in a chair on the verandah, with a cooling drink at one's elbow, life in the tropics is delightful;

but when one has a hundred odd jobs to do, besides the day's active work, life assumes an altogether different aspect; and we were not lazy, because we had not come merely to amuse ourselves. There was the Rio Blanco, the White River, so called on account of its somewhat whitish water, which rushed along its boulder-strewn bed of limestone where we went to fish in the deeper pools. Easier said than done; even the preparations took two days' nagging and worrying over. Plenty of dynamite cartridges were kept at one of the outhouses: it cost us one day to get them; then came the hunt for the fuses, and these were discovered at the store together with lamp-wicks, no doubt on the strength of their similarity. It was always the other man who knew, or who was in charge, or who had the key, and he invariably was the man who happened to be away. Thus went the second day, and still something was wanting—the detonators, which, on the following morning, were coaxed out of the storekeeper's coat pocket. Mateo and I had intended to start operations in the cool of the morning; it was already hot before we got under way at last, and then, to reach a suitable place, we had to cross a field of Indian corn. That was a clearing which had been made by cutting down and setting fire to the trees, the charred trunks and bigger branches being left in the position in which they happened to have fallen. They formed regular stockades, and the reverberating heat was maddening. At last we prepared for action, to find that the fuses did not fit into the detonators. However, all went well, and in the excitement of retrieving the stunned fishes we managed to ford the stream, which in our subsequent calmer mood we lacked the courage to recross. We only got back by wriggling through the overhanging boughs, and then on to a fallen tree, along which we crawled on all fours—all this encumbered with a rifle, a landing net, glass bottles, and pockets full of cartridges and spoils.

Then came the tramp home in the noon-day sun, the pickling and labelling of specimens, and the making of notes, with many bruises and scratches and a burning skin, a squeamish appetite, and the petty mental disturbances —all more than sufficient for the day. In the evening came

the setting of traps for various kinds of opossums (*Didelphys virginiana* and the little *D. opossum*) and little rodents.

It was quite a relief to prowl about in the beautiful forest, prying into hollow trees, turning over logs and stones, or—which was generally more effective—sitting still and watching for whatever might turn up. One day a native, with Mateo and myself, had been out collecting at our leisure. We had shot, or rather stunned, some fish and frogs; had caught one little tree-frog (*Hyla staufferi*), hitherto known only from

VIEW FROM MOTZORONGO; CITLALTEPETL IN THE DISTANCE.

Guatemala, and had found a nest resembling that of a bird in a bush, whence jumped out a mother opossum (*Didelphys opossum*), called "ratón tlacuache," with nine young. We assisted the dog in treeing a carnivorous beast of some kind, had caught a snake or two, and then one of us stumbled over a root that stretched across the path. The Indian hacked at this with his machete, and I picked out of the loosened mould a treasure indeed, in the shape of a miserable-looking, blind, limbless kind of lizard—*Anelytropsis papillosus!* The two type specimens "from near Jalapa" had been described in

1885 by E. D. Cope ; this, the third specimen ever got, is now at the British Museum.

Well satisfied we had a smoke, and, half-an-hour afterwards, the Indian stretched out his hand and picked from off the very stump upon which we rested a fine *Corythophanes hernandezi*, a rare and curiously-shaped lizard, of which I only got two more specimens. He had looked at that loose, upstanding piece of bark several times, but it was not until it moved that he recognised the " teteréte," the Nahoa term for any long-legged and long-tailed climbing lizard of the *Iguanid* family. These " teteréte de tierra " remind one of a chameleon in respect of their shape, and their light brown colouring enhances their apparent resemblance to a dead branch or piece of bark. I succeeded in taking this specimen home alive, where it soon became tame. The rivers and pools all through the " hot-lands " are tenanted by another iguanid (*Basiliscus americanus*), the " teteréte de agua," " basilisk," " pasarios," or " ferryman." This is a vegetable feeder, growing more than a foot in length, with helmet-shaped head, the back and tail of the male, which is larger than the female, having a high, reddish-coloured, serrated crest, the prevailing colour of the body being greenish. These lizards are very shy, and sit mostly on branches near the edge of, or overhanging, the water. At the slightest alarm they plunge in and then run, half erect, and rapidly beating the water with their long hind limbs, helped by their long wriggling tail, across the pond or stream, to climb up and hide in the shrubs on the other side. It is a curious sensation to see a large lizard thus ferrying itself across the water, and to hear the rushing, paddling noise.

The station of Motzorongo had been without a telegraph office, but one morning an operator arrived, who was installed with his instruments in one of the empty buildings. This man caused, later on, a considerable upset and trouble. He had brought his wife with him, a tall white woman, with a profusion of red, touzled hair, the sight of whom proved too much for an amorous Irish clerk, and conjugal recriminations were the result. Eventually—this was reported to us long after the event—the husband, who was a methodical man, sent

to the capital for a new six-shooter and a box of cartridges, put all his account-books in order, wrote an explanatory letter to his superiors, indicating that he might be prevented from continuing to perform his duties, went straight to the stores, fired two bullets into the offender, and a third clean through him, and thereupon gave himself up to the first person who cared to arrest him.

MAZATECA WOMAN.

The original offender lingered long between life and death, to recover under the fostering and assiduous care of the siren who caused the trouble. The husband, who was the actual culprit in the drama, being all that time kept in jail, and a Mexican hot-country jail is not a sanatorium. The magistrate, pressed by friends of both parties, found it difficult to discharge his duty. If he tried a man who, under much provocation, had drilled a few holes into another man, the

sentence could not possibly satisfy the friends of the wounded ; and if he were to acquit him, and the wounded man were to die later, it would be still less satisfactory. Obviously it was a case of " mañana veremos todo," " we'll see to it all to-morrow," and many repeated " pasados mañanas." *Solvitur ambulando*, as time goes on. As in course of time it became clear that it was not a case of homicide, and since both men had suffered,

A MAZATECA HOUSE.—TYPE I.

and the siren had behaved so very impartially by even nursing the wounded man, the case fizzled out, and the trio left the spot as being one that was too unhealthy to live in.

The natives throughout the valley from Cordoba to Motzorongo speak Spanish, and are supposed to be Mexicanos (*vulgo* Aztecs), who, in olden times, had extended their influence into the lowlands of Vera Cruz. To be quite correct, only the dominant settlers in the villages are Aztecs, the rest of the

population being of doubtful affinities. A few miles to the south, however, lives a genuine tribe, the Mazatecas, who belong to the great Mixteco-Zapoteca family. Some of the land of the Motzorongo Company extends a long way into the territory of this interesting tribe, one of whose "caciques," or chiefs, a young and courteous fellow, invited us to pay him a visit on the Rio Tonto.

We set out one fine morning due southwards to the large village of Tezonapan, four miles off, where many hundreds of natives had collected for a fair. Then followed a long ride through most impressive primeval forest, over a road made by simply clearing a broad path through the luxurious growth, the foothills or spurs of the sierra being crossed to the westwards at an average altitude of about 1,000 feet above sea-level. Owing to these spurs the path dipped and rose again, with a water runnel, or morass, here and there, bridged over by felled trees. In bygone days the road must have been quite tolerable; there was even a telephone wire to Josefines, but many of the poles had been broken down, and the wire, partly cut and taken away by natives, made the most awkward entanglements for the horses, as it twisted about and coiled in the grass. This sufficiently explained why telephonic communication with Josefines "had recently got out of order."

This place, which we reached late in the afternoon, was a dependency of the chief hacienda, and was in utter ruins, being only tenanted by an old Indian couple as caretakers. Nothing whatever was to be got there except shelter, and we spent a lively night. To begin with, it was just the right kind of night, as the old Indian sympathetically explained, for the "chaquistles" to turn out in myriads, these being tiny black gnats, which settle upon the skin and burn it like red-hot grains of sand. Then rats rummaged about under the beds, to see what supper the unwonted strangers might have left, and scuttled and rustled around, squeaking and chattering as they ran. At last sleep came, but was soon broken by a grand outburst in the shape of opossums which hunted the rats and caught some of them in the palm-thatched roof. The caretaker said that it was probably their "masacoatl," the boa, which

had been hunting in the roof, but it did not sound like the long-drawn rustle that is made by these creatures. Although this was a "snaky" place, we caught only two small specimens in the kitchen whilst preparing breakfast.

The next day, fortunately rainless, was spent in still grander forest, until we came at last to La Raya, a kind of *Ultima Thule* settlement close to the Rio Tonto. The great man, in

STARTING FROM JOSEFINES.

command of the large store-house, was Sr. La Barraque, a most agreeable young fellow of Spanish-French extraction. He was married to a quiet, good-looking Mazateca girl, to whom he was much attached, and for whose uneducated Indian ways he very pleasantly apologised. This was quite unnecessary, since her manners were charming. She spent much of her time in embroidering cotton "huipiles," or female garments, and table-covers, with the typical Mazateca patterns. He

himself was something of a sportsman, having quite a collection of firearms, antlers of deer, skulls of the jaguar, and of the smaller ocelot, or tiger cat, all of which beasts were plentiful.

We were installed in the hall of judgment, assembly room, town hall, or whatever one likes to call the large official municipal structure, a typical "hot-country" erection, consisting mainly of a thick, high-pitched roof of palm-leaves, with great, low eaves. The house was made entirely of vegetable matter, without a single nail or other piece of metal. The

EMBROIDERED "HUIPILES"—MAZATECA TRIBE, EASTERN OAZACA.

framework was of unhewn stems and beams, the walls and the roof of the ribs of palm-leaves, neatly lashed together with the natural rope-like cords of the "bejugo de agua" plant, or with the flattened, creeping stems of some other liana, called, from its obvious resemblance thereto, "costillas de vaca," or "cow's riblets." This latter plant is poisonous; well pounded, and then left to soak in a stream, it is used for catching fish. The interior of the room itself measured about twenty-four feet by fifteen. The construction of such houses (and the others were all of the same kind, only smaller) is very destructive of palm-trees. One side of the roof of our hall alone

VIEW FROM LA RAYA.

required some eighty palm-ribs, and the whole roof, therefore, took some three hundred and twenty leaves, a single perfect palm-tree possessing only about twenty of the required length (from fifteen to eighteen feet). This implies the lopping off of the leaves of at least sixteen trees for the roof alone. Besides these, many ribs are required for the wattled walls, which in so hot and moist a climate have to be renewed every three or four years, the stalks rotting away near the ground, in spite of the protection afforded by the broad, overhanging eaves. Since a palm-tree does not recover from such a severe lopping within a few years, the inevitable result is that near an Indian settlement most of the palms present a deplorable, maimed appearance, and have become scarce.

Not far from the town hall stood the prison, a small cage-like structure of strong beams, roughly hewn into shape. All round it the flat piece of ground was kept scrupulously clean, and the raised portion, which stood well up above its immediate neighbourhood, commanded exquisite views. Towards the west the river went winding through low forest and open cattle-pastures, while across the river were densely-wooded hills in well-nigh unknown country. But the grandest views were those to the west and north. In the foreground was the conical, square-topped Cerro de Masatiopá; beyond, precipitous cliffs of yellow limestone and jagged sierras were silhouetted against the horizon; and due north-west, across high, grassy meadows, impenetrable bushland, green forests, and purple and blue hills, arose the resplendent white cone of El Pico, here no longer called Citlaltepetl, but "Nassitshoá," or the "Thunder-Mountain."

Meals were taken in the big store-house amongst lively company. Two tame, yellow-headed parrots climbed about the house, and a third, the oldest and most independent, sat on a rafter above the raised hearth eating a "jilote," or cob of Indian corn, and chattered Mazateca to his young mistress, a shy servant. Turkeys, geese, fowls, and two families of musk ducks, with several dogs and cats, went in and out of the house, that lacked both doors and windows. In the evening toads began to mutter, to trill, or to mew like kittens, now and

then giving a snarl in deep bass—and we heard all the voices of the plentiful *Bufo marinus*, from the tiny half-inch baby born this spring to the old six-inch mother, who during the daytime sat in her own cavity under the waterbut.

The Rio Tonto, a north-western tributary of the mighty Papaloapan,* was in flood, a big, green-yellow, rushing stream, with delightfully cool water, in which we swam about to our heart's content, the sensation of coolness being refreshing beyond description to our sun-heated bodies. Although very rapid the river was deep, in many places about twenty-five feet, and the canoe-men soon ceased to touch bottom with their long poles. The canoes, long, hollowed-out trunks, were most unsteady, and only poles, no oars or paddles, were used. Owing to the fact that all the sandbanks were submerged, it was a bad time to try and see crocodiles, which are said to be numerous, and the same remark applied to the tortoises, but a small collection of fish was made, and meanwhile we beheld an amusing sight. On the opposite high bank was a kind of landing-place. The rains had thoroughly soaked this spot, which consisted of a steep incline of thirty or forty yards, and a number of naked, coffee-coloured boys amused themselves with slithering down the slippery red soil ; one of the boldest shooting down from time to time feet foremost into the river.

The whole district appeared to be an ophidian paradise. The most dreaded was the "palanca" (*Lachesis lanceolatus*), from the bite of one of which a boy had died within twenty-

* This river well deserves its Aztec name, which means "Butterfly-[illegible]er." It was tantalising to see the great blue *Morphos* rapidly sailing overhead and then hovering over the water, always out of reach, and so swift in its movements that pursuit was hopeless. Yet even these resplendently beautiful insects had their enemies ; not birds, but big dragon-flies, which darted out of ambush on the banks of the river, and with a shrill noise, like little rockets, made for the passing butterflies. The only chance of escape for the latter was, apparently, to reach some branch upon which to alight, and by folding up its large wings to hide its gorgeous colours. We all know how easily a butterfly can suddenly thus become invisible, but whether this dodge is sufficient to elude the many-facetted eyes of the rapacious pursuer is another question. A great physiologist, Joh. Mueller, has written a paper on "The Sight of Insects," in which he proved, to his own satisfaction, that dragon-flies could not possibly discern the two ends of a stick, unless this was at least a yard in length !

four hours, the reptile in question having a partly digested "sabanera" (*Coluber corais*) in its stomach. Coral snakes were common, as also were certain other harmless kinds (*Urotheca elapoides*), almost identical with the former in their beautiful coloration. Tree-snakes abounded, but they were, as usual, difficult to observe ; such, for instance, were the whipcord-like *Himantodes cenchoa*, *Leptophis*, and the long and slender-snouted *Oxybelis æneus*, called "bejuquillo," or "suchil," by the natives.

CORAL SNAKES AND "WARNING" COLOURS.

Coral snakes are beautiful and very poisonous. Fortunately, they are not vicious, and the gape of their mouth is so limited that only the larger specimens can inflict a dangerous bite. When they do bite they do not strike like vipers, but deliberately select a spot, bite slowly and chew it, so as to work their very small fangs well in. They are usually paraded as glaring instances of warning coloration, but I am not at all sure whether this is justifiable. Certainly these *Elaps* are most conspicuous and beautiful objects. Black and carmine or coral red, in alternate rings, are the favourite pattern ; sometimes with narrow golden-yellow rings between them, as if to enhance this beautiful combination. But these snakes are inclined to be nocturnal in their habits, and, except when basking, spend most of their time under rotten stumps, in mouldy ground, or in ants' nests, in search of their prey, which must be very small, to judge from the size of the mouth.

Black and red are very strong contrasts in the daytime, but this combination ceases to be effective in the dark. It is an easy and suggestive experiment to cut out and paste together patterns of variously coloured unglazed paper, and then gradually turn down the light to watch the effect. Upon a black ground red is the first colour to disappear, or rather to produce in combination with it a neutral tint ; next follows orange, then green and blue, and lastly yellow, which is far less easily effaced than white upon black. We conclude that in most cases the combination of red and black is a self-effacing, rather than a warning, pattern.

However, let that pass. There is another, greater, difficulty. It is usual to explain the occurrence of supposed warning colours in harmless creatures as case of mimicry. No doubt there may be fair instances of the mimicry of a dangerous animal by a harmless one, both of which live side by side, or at least within reasonable distance of each other. One is liable here to argue in a circle. Instances of mimicry, beyond cavil, seem to occur between the coralline *Elaps* and a number of other, harmless, snakes. But let us analyse the cases. It is very difficult to ascertain the distribution of the true *Elaps* in Mexico, since the natives are in the habit of calling any black and red snake a "coralillo," although, when pressed, they admit that some are harmless, while others are poisonous. For instance, in Southern Guerrero, at San Luis, the "coralillo" was the harmless *Coronella micropholis*, of which a specimen was said to live in every kitchen under the water-tub. Several kinds of harmless snakes, belonging to different groups, inhabit the same districts together with the poisonous coral snake, and, what is more, they lead the same kind of life under rotten stumps and in ants' nests. The resemblance of the striking colours and pattern is sometimes very close, quite enough to make one reluctant to handle them.* There seems to be no reason why we should not call these cases of mimicry; and yet this is most likely a wrong interpretation, since such harmless snakes are also found in districts where the *Elaps* does not occur, not only in Mexico, but likewise in far distant parts of the world, where neither elapines nor any other similarly-coloured poisonous snakes exist. To interpret this as an instance of "warning colours" in a perfectly harmless snake, which has no chance of mimicry, amounts in such cases to nonsense, and we have to look for a different explanation upon physiological and other grounds.

* For instance, *Elaps fulvius* and the harmless *Urotheca elapoides*, one of the *Opisthoglypha*, were caught at La Raya. *Streptophorus atratus* and *Geophis semidoliatus*, individually, often resemble coral snakes—for instance, at Orizaba, and in the tropics, at La Raya, and near Motzorongo. The *Dipsadine Homalocranium* and *Scolecophis* are climbers and diurnal, thereby differing considerably from *Elaps*. *Coluber porphyraceus*, also with alternate black and red rings, lives in China.

LEAF-CUTTING ANTS.

In such forests our eyes are sure to be attracted by a procession of apparently migrating pieces of fresh green leaves, all neatly cut out and walking in an upright position, as each is held in the jaws of an ant. Let us follow this stream to its source. It comes down from the stem of an orange or lime tree in our host's most cherished plantation. Thousands of ants are sitting upon the leaves, each holding on to the edge and scissoring out with its jaws a piece of the leaf, the cut forming part of a neat circle. This is allowed to drop, to be carried away by the other ants which are waiting below; or else the cutting ant jerks the load, which is many times larger and heavier than itself, on to its back and climbs down. Within a few hours that tree may be stripped of all its green, only the ribs of the leaves being left, and it will probably die unless the attack was made during the sprouting season, but in any case that year's prospect of a harvest is gone. Now let us follow the procession along its well-beaten track, where nothing is allowed to grow, because of the millions of little feet which have trampled over it. It leads over many obstacles in a straight line for hundreds of yards until we come to a slight rise of ground in the forest, where we sink half up to the knee into a blackish-brown, smeary compost of rotten, ill-smelling vegetable matter. The mound may be a foot or two in height, and may measure several yards across. What we see is only the used-up or spent manure, the remains of the millions of bits of leaves which had been taken into the cavities in the ground, there to be further chewed into pulp, and then allowed to ferment in the countless passages and chambers of the mound, which is honeycombed in every direction. In the fermenting mass grows a fungus in profusion, and this forms the sole food of the ants and their larvæ. We have, in fact, walked into a huge, scientifically-constructed mushroom bed—a farm for the cultivation of mushrooms, and the nursery of the independent state of some species of *Eciton* ants. That the whole thing is in good working order is soon impressed upon us by the territorial army, the garrison of soldiers who are swarming

out to attack, whilst the workers rush about in the well-known style of disturbed ants.

The study of these and similar leaf-cutting ants has produced an enormous literature within the last dozen years. It is a fascinating subject, leading straight into fairyland ; and it is also easier to clothe some of the astounding facts in fairy language, than to try and express the complicated conditions in scientific terms, which—let us be honest—sound very learned, and yet may be not a whit better when we are hard pressed for their real meaning ! It is a case of " myrmecophytic symbiosis," through the adaptive transformation of originally suffering into myrmecoxenous plants. We prefer a more frivolous rendering of " myrmecoxenismus." Trees are liable to be visited by the attacks of leaf-cutting ants—especially introduced trees, which are quite unprepared for such conditions, while native trees have had time to hit upon some defensive plan. The best way of fighting ants is to get other ants to fight them. Lucky are the trees which possess such inducements to attract the mercenary ants, either by means of honey and other food, or by offering them shelter. Thrice lucky are the plants which can combine such attractions. Some acacias have managed it. Their twigs grow pairs of bull's horns, hollow spikes, modified stipules ; ants bite a hole into the base and live in these fortresses ; and on the tips of the pinnate leaflets is a little gland or other modification, full of honey, or a proteid, or some other stuff which is good to eat, and can be spared by the plant. And these little bodies are beloved by the ants, which, thus receiving board and lodging, are content to stay, to garrison and to defend furiously the hospitable tree against any aggressor. The system answers well. How it has come about, whether by teleology or by natural means, is another question, the answer to which must depend upon personal inclination. There is no arguing in such matters.

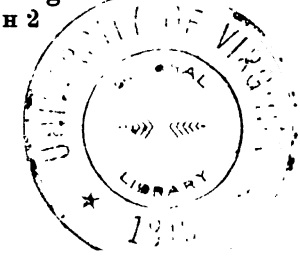
* * * * *

In moist places we found growing the " bejugo de agua," a long, straggling liana, the stem of which contains an astonishing amount of water, to obtain which the soft stem is cut

through in two places about a yard apart, whereupon the water flows out readily. A piece nearly a yard long, and of the thickness of an arm, yielded an average-sized glassful of water, quite pure, rather cool, and without any taste. The natives make use of the plant for quenching their thirst.

On our way back to Josefines, which was again to be our resting-place, an awkward accident happened. The night's rain had made the road in the forest very wet, and whilst we were crossing a creek by one of the "bridges," consisting of several-tree stems laid across side by side, my wife's horse slipped between two of the stems and jammed both her and itself between the beams, my wife being firmly pinned down by her dress and one leg. We had to cut her off the kicking horse, which every moment threatened to fall upon us as we stood in the mud below. To liberate the horse was an easy matter; we had only to move the beams asunder, when it turned a complete somersault and plunged into the mire, its legs kicking in the air. For a wonder, no bones were broken, and the fright seemed to affect Mateo and myself more than the lady, who calmly sat down to stitch up her dress whilst we got the trembling horse up again. Mateo, always excitable, became quite exuberant when, at the lunch improvised soon afterwards, we drank the lady's health in some extra strong liquor. When, further on, an armadillo scuttled across the path, Mateo came out with a revolver, which he had concealed until then, to shoot behind our backs at imaginary jaguars.

An attempt to get some water-tortoises in a small, but deep, lagoon with steep banks ended in failure, as it had done a few days before, the turtles plunging into the water long before we could get through the thick brushwood. But there was another and larger lagoon in the midst of beautiful forest. A big tree, which had fallen conveniently into the pool, gave us access, allowing us to observe several crocodiles that were floating in it, but every attempt at collecting in that paradise was hopeless. As usual, the brushwood formed so dense a tangle, with formidable thorny creepers, that progress was almost impossible, and certainly useless, since the noise made by forcing one's way through was more than sufficient to frighten



away or into hiding every creature for dozens of yards around. Then came black, oozy mud, and worst of all, near the margin of the pool, another kind of tangle, formed by roots, whilst shrubs and trees barred access to the water. It was always the same aggravating condition, with few exceptions, always an apt illustration of "so near and yet so far."

Another pool, between Josefines and Motzorongo, the Laguna Grande, in a somewhat more open place, proved more

A MAZATECA HOUSE.—TYPE II.

accessible. It was a big swamp, with a large patch of permanent water. I had scarcely gone a hundred yards through the high grass when a full-sized black *Coluber corais* slipped from its basking-place on a stump to the right, not a yard in front of my feet, and rushed straight for the water; the creature looked ridiculously long, there seemed to be no end to it in the grass, and yet it could not possibly have measured more than ten feet. I confess it made me jump, and this startled a big, fat crocodile which otherwise would have let me pass within five yards. It fairly hustled through the

reeds, and with a big splash disappeared into the water, to reappear, with nose and eyes peeping out, some forty yards further on. Of course I missed that head. The report silenced the lovely little Inca doves, cinnamon brown, with delicate white and grey crossbars on the under-side, which were, as usual, billing and cooing in the trees; but it also startled a pair of parras, or jaçanas, which became quite beside themselves, loudly vociferating, rising a few yards in the air, then alighting and running upon what seemed the surface of the water itself, though in reality they were merely running over the broad leaves of nymphæas and other floating plants, which their long toes, and still longer straight claws, enable them to do to perfection. Each of these pairs seemed to have its special domain; when at last one left off, another pair was sure to take its place, with the same frantic excitement, sometimes flapping like peewits close above, then sitting down, screaming, and pointing at me for a whole minute, and then flying off again.

There was much to see in and around that pool, which in many places was as treacherous as a floating bog of rushes and peat, and much intersected by open water, so that I was not sorry when, after an hour's struggle, I had made the round, without having collected so much as a frog. The heat hovering over that swamp had nearly dazed me.

CHAPTER V.

FEATURES OF TROPICAL FORESTS.

The conditions necessary for Tropical Forests—General impression and leading Features—The fierce Struggle for Existence—The effect of Environment upon Animals and Plants—Adaptations to Arboreal Life—The prevailing Colours and Patterns—Cases of convergent Development.

The conditions necessary for the production of a typical tropical forest are moisture and heat. The mean temperature is that of the tropics, say 80° F., rarely sinking below 70° or exceeding 90°. The moisture must be due to rain, and a fair minimum for the annual fall is 200 cm., or 80 inches, the more the better. This rain must be distributed rather evenly—that is, seasons of drought must not be too prolonged; the dry period, if there is one at all, must not amount to three months, lest the vegetation come to a standstill, thus causing deciduous leaves and other great changes in the general aspect.

There are three big regions in the world which fulfil these conditions. First: Tropical America, with the huge Amazon basin as its centre, called by some authors "Hylogæa," or "Dendrogæa," the world of trees. It extends through Central America into Mexico, mainly on the Atlantic or eastern side, the backbone of the country causing a very striking division. Secondly: Equatorial West and Central Africa, mainly the Congo basin. Thirdly: Indo-China and the Malay Islands. Smaller centres exist in many other parts of the world, for instance, on the Zambesi, the east coast of Madagascar, the south-western seaboard of India and Ceylon, the north coast of Queensland, several of the West Indian Islands, etc.

The rainfall of 80 inches is in itself nothing very tremendous. It is true that we call a climate with half that amount decidedly wet—*e.g.*, the north-west of Scotland and the wettest parts of Ireland enjoy about 60 inches—but in the tropics the rain makes more of an impression by its being generally limited, in duration, to a few hours of the day, as is the case with a thunderstorm, gentle rain with a fall continuing steadily for a number of hours in succession being a rare occurrence. With the onset of the big rainy season the water comes down in torrents, and at first may continue both day and night without interruption, but the fall soon becomes more regular, and it then rains every other, and, finally, every third day, the storms being restricted to a few hours' duration. A fall of half-an-inch makes a rainy day with us. A fall of an inch during a two hours' storm is of common occurrence in the tropics; moreover, torrential storms are frequent, a few days' intermission being made up for by a regular downpour. For instance, in September, 1902, on the Isthmus of Tehuantepec, six inches fell within two nights and a day, which means a continuous fall of one inch for every six hours.

These prolonged rains, always accompanied by thunderstorms, make camping in the forest an unmitigated misery. The electric discharges produce a great quantity of nitric acid, which is washed out of the air into the humus, and this process is no doubt one of the main causes of the incredible exuberance of the vegetation in every tropical rainy district.

What is the general impression of such a rain-forest? It does not begin gradually. On its outskirts it is fringed by an impenetrable wall of luxuriant herbage, shrubs and creepers, the *tout ensemble* recalling a lavishly-arranged bank of flowers at a flower-show. It can be entered only by hacking and slashing a path through the tangled growth, which closes up again within a few weeks, except where traffic may have produced a narrow, meandering track, from which it is impossible to deviate either to right or left. Once inside, we are in a gloomy, stuffy forest, consisting of tall straight trees, which branch out at a great height above us, there inter-

lacing and forming a dense canopy of green, through which passes little or no sunlight. This absence of direct light effectively prevents the growth of underwood, and there are no green, luxuriant plants, no flowers or grass. The ground is brown and black, covered with many inches of rotting leaves and twigs, all turning into a steaming mould. From our

TROPICAL FOREST.

point of view below the canopy, the leaves, branches, and even bright-coloured birds, look black, and this is still more the case where, by contrast, such objects are seen through a rift in the canopy against the glaring sky.

Many of the tree-stems are entwined by the twisted rope-like stems of lianas, long strands resembling the rusty frayed-out strands of a wire cable, ugly in shape, and without branch or

leaf, until they reach the crowns of the trees, where they intermingle with the green roof and creep across from tree-top to tree-top, perhaps for hundreds of feet. Many a liana has strangled its support, which has rotted away and disappeared. The creeper now, made fast to the ground, ascends straight through mid-air and there vanishes, like the rope of an Indian juggler. Liana is a comprehensive term. Many of them are vines of the genus *Vitis—e.g., Vitis pterophora ;* where these are not indigenous, one or other of the numerous Bignonia family undergo the same modification.

Wherever there is a break, where a tree has crashed down and made an opening, the other trees are covered with masses of climbing arums. Phyllodendrons send down their straight, wire-like sinkers and air-roots, until these are anchored in the ground fifty feet below ; their large scroll-like blossoms, of white, yellow, or red, are visible from afar ; the supporting stem is covered with a network of the climbing stems, which become receptacles for the collection of mould, or hot-beds for other plants, mosses, selaginellas, ferns, lichens, and a host of gorgeous orchids, bromelias, and other epiphytes, the seeds of which have started to grow many feet above the ground, so that these plants never know the ground proper. They were born aloft, have grown aloft, generation after generation, until they have forgotten what it was like to grow up from the bottom, and thus they have become epiphytes. Many of these (though never their primary supports, the trees themselves) have dodges for conducting, collecting, and storing the rainwater, all their leaves forming a nest-like whorl, as is the fashion of some bromelias and tillandsias, or maybe one leaf has developed into a scroll-like receptacle, or actual cups have been invented. Only rough and thick-barked trees tolerate such epiphytic masses ; others, perhaps the majority, protect themselves by having a very thin and slippery bark, and, to make quite sure, peel periodically like our plane-trees.

A great feature of such a tropical forest is that it is composed of an astonishing number of different genera and species of trees, forming the greatest possible mixture of all kinds, while continuous groves, or even clumps, of one kind of tree are

rarely met with. Whilst the temperate region has extensive oak, beech, and pine forests, mixed, of course, with other kinds, no such uniformity exists in the tropical belt, unless we ascend into the mountains. There is cause for this variety. The exuberance of life is so great, and therefore the struggle for individual existence is so severe, that there is little chance for two trees of the same kind to succeed in growing up side by side. It is almost by a lucky accident, that one grows up at all, where hundreds of other plants want to do the same. Such a forest brings home to us what the struggle for life really means, and what it can do. It is the struggle for sunlight and for rain-water, and to get them at first hand. One of the results is the height of the trees, a result to which, so to speak, they have forced each other, till they have developed into tall, slender, branchless stems, with an interlaced canopy above. Whatever plant cannot grow tall of itself, climbs on to its neighbour's shoulders. Even cactus in a forest can climb like ivy, and many of them have learned the trick so successfully that they have transformed themselves into epiphytes, either remaining still upright in form, or in the guise of big, many-tailed pendent bunches, and living thus apparently out of harm's reach; their character has become modified, and they have lost their dreadful spikes. Such is the forest. Let us now consider its animal denizens, of which we have read and dreamed so much since our childhood, the fierce beasts of prey, the dangerous snakes, the gorgeously-coloured birds and butterflies. Full of expectation, and perhaps a little afraid, we fight our way into the paradise, feel oppressed with the sweltering heat, and relieved when we are out again, all sadly disenchanted because we have not seen a single living thing! The observation of animal life is most disappointing to the uninitiated. One may roam about in this gloomy forest for hours and hear little, and certainly see less. All you can collect, if you know how to look for them, are a few toads, small, even diminutive, and very darkly coloured, living on the ground, and hiding amongst the roots and the mould, as do many worm-shaped lizards and snakes. You hear a few birds—*e.g.*, those which, like trogons, motmots, and pigeons, are habitually noisy callers—but you see very

few and catch but glimpses of them, and such mysterious sounds as you hear cannot be located. A sudden rustle, scuttle, or splash in a pool may have been produced by some mammal, the meeting of which is out of the question.

Where are the two hundred different kinds of mammals, birds, reptiles, and amphibians which we know to exist in the Mexican tropical forests? Most of them inhabit the roof-garden which is formed by the tree-tops. If by a lucky chance we obtain a bird's-eye view from some eminence, we behold a different world. A dense green carpet overstrewn with thousands of mauve, pink, yellow, or white flowers of some kind of bignonia, visited by countless butterflies, which are preyed upon by lizards and tree-frogs, these being in their turn sought after by tree-snakes. Of bird-life, gorgeous and beautiful in colour, there is plenty. Vividly coloured also are many of the other creatures—frogs, snakes, lizards and butterflies. Colour has to be laid on vividly, quiet coloration being out of place. This colour-contest was started by the blossoms, red, yellow, or white; self-colours, not variegated, predominate, and stand out very effectively against the green. If a creature intends to be seen, to display its beauty, it has to use the brightest colours, since it is only by contrast that it can hope to attract attention. Again, those which do not want to be seen must dress in tints as emphatic, and as "saturated" as are the prevailing tones of the environment. Most of the tree-frogs are green, but some are delicate studies in brown, with irregular markings to suit the moss and lichen-covered branches upon which they rest. Some of these frogs have flash-colours, varying from orange to yellow or red, on parts which are quite concealed when the creature sits still. He trusts to not being discovered, but touch him, and he makes a tremendous jump; there is a flash of yellow in the air, which vanishes in a moment, the frog likewise vanishing; he has caught hold of a leaf with some of his finger-disks, vaulted on to it, and there sits demurely, indistinguishable from the foliage. The scientific explanation is that he has dazzled his pursuer by this sudden and unexpected display of colour. We find the same principle in the blue and red under-wings of some of our grasshoppers. These

colours are not designed for merely æsthetic sexual gratification, nor are they warning colours or recognition-marks; they are devices for use in an emergency.

Nearly all the tree-top snakes are green, and so are many parrots, motmots, and other typical forest-birds of the tropics. Other parrots, pigeons, toucans, are loudly coloured, but these very colours mingle with their bright surroundings to a marvellous extent. Tropical light can be so fierce and resplendent that a whole flock of bright parrots in a tree will simply vanish; in a museum we find it difficult to understand how such conspicuous objects can ever manage to elude discovery. If we now continue our investigations below the tree-roof, there are, of course, many creatures which live habitually upon the branches or stems of the trees. These have more sombre tints of brown, and are speckled or barred. Lastly, those few animals that live on the ground itself, are nearly all dark of colour, whether toads, frogs, lizards, snakes, or birds. It would be no good to wear a beautiful dress in a badly-lighted place; or, rather, it is impossible, as such colours could not be developed there. Some apparent exceptions, of course, occur, mostly among amphibians and snakes, a few of which are beautifully coloured with black and red. For instance, there are the coral snakes of America, the uropeltid snakes of Ceylon, and various Indian and African frogs and toads. All these creatures are nocturnal, and spend most of their time underground. When they do crawl about, they are practically invisible, since black and red are the very colours which, when combined, mingle in the dark into a neutral tint; black and orange, on the other hand, mutually enhance each other.

Another point concerning the coloration of the forest fauna is the pattern. Except when this is more or less uniform, the ground colour is broken up by white or yellowish spots, arranged in several longitudinal rows. Many snakes and lizards are thus marked; the young of many mammals pass through a stage of this kind, notably those of deer, the peccary, the Central American tapir, and the *Felidæ*. There are no stripes of light in a dense forest; what sunlight there is, appears in the shape

of little round disks like diminutive sun-images, and these are —let us put it boldly—stamped upon the skin. If we follow the same kind of dark-skinned, white-spotted lizard out of the forest into the savannah or the grassland, its corresponding race or species has no spots, but white longitudinal stripes; those which live in districts partaking of both characters, in the open, are barred like zebras; and the species of the same genus which live in the desert have a pale ground-colour with dark spots.

Most of the inhabitants of tropical forests lead an arboreal life. This is the prevailing feature. There is no hurry, no bustling, but they must be able to climb well. Let us consider how this necessity has modified the various creatures concerned.

The majority of the *Anura* have acquired arboreal characteristics. They have adhesive disks on the fingers and toes; the hind-limbs are long and slender, and well fitted for jumping long distances, and for catching hold of a leaf or twig by means of the pads. The Mexican tree-frog (*Phyllomedusa*), has even developed a hand that can be used for grasping, with the thumb opposed. Such arboreal *Anura* are found in all suitable forests, and the most interesting point is that these climbers by no means all belong to the family of *Hylidæ*, but that nearly every one of the main groups of the *Anura* has produced at least some typically arboreal forms, in spite of the considerable structural differences which distinguish, for instance, the toothless toads, or *Bufonidæ*, which have the two halves of their shoulder-girdle movable and overlapping, from the *Ranidæ*, or true frogs, which have teeth, and the two halves of the shoulder-girdle firmly united. This is so significant that it is worth detailing. There are: First, the *Hylidæ*, the family of professional tree-frogs as we might call them, since nearly all its one hundred and fifty species are arboreal. Although this family is almost cosmopolitan it is very unevenly distributed, there being none in Africa and Madagascar, only two or three in the whole of Asia and Europe, but several dozen in Australia, and scores upon scores in America, especially in the tropical parts. Secondly, *Cystignathidæ* of numerous kinds, but re-

stricted to America and Australia ; only those of the big American forests have adhesive disks. Thirdly, *Bufonidæ*, or toads, a cosmopolitan family, mostly slow, short-legged, and living on the ground, but in the forests of West Africa, Southern India, and Borneo, some have been modified into typically arboreal forms. Lastly, *Ranidæ*, or true frogs ; cosmopolitan, but essentially inhabitants of the northern hemisphere. Out of a total of some two hundred and seventy, scarcely a dozen kinds extend into the north-western parts of South America, and all those are now typically arboreal. But such "tree-frogs" have been developed out of *Ranidæ*, also in Africa, Madagascar, India, Malaya, and China, because in those countries there are no *Hylæ*, and *Ranidæ* happen to be the only material available for counterfeiting them. In this respect the forests have succeeded so well that it is, for instance, impossible to distinguish certain green tree-frogs of the African genus *Rappia* from a *Hyla*, unless we cut them open. If they lived side by side, which they do not, this close resemblance would be extolled as an example of mimicry. In reality, it is a case of heterogeneous convergence, brought about by identical environmental conditions. One might almost say that tropical, moist forests must have tree-frogs, and that these are made out of whatever suitable material happens to be available.

The same remark applies to tree-snakes, which every forest-country possesses, and it is immaterial whether the available stock of snakes be boas or pythons, harmless colubrines, cobras, vipers, or even pit-vipers. In India all these kinds have contributed to this class ; in Africa, of poisonous snakes, only vipers ; in America only boas and colubrines have done so, since there are no vipers, and most of the pit-vipers are turned into rattlers, which cannot climb at all. Professional tree-snakes, those which do nothing else but live in the trees, invariably have a very long, slender body, with an excessively long, whip-like tail. Thus they are able to glide, almost to jump, through the foliage, from branch to branch, from tree to tree, the long body and tail always finding some support. In the most typical tree-snakes, whether in Brazil, Congo, India, or Australia, the horny shields of the flat belly are bent

so as to form a continuous sharp edge all along the sides, so that these snakes can glide both straight and along the trees. It is, by the way, only the snake of the artist, from the days of the Greeks to the days of the Royal Academy, that climbs trees in spiral fashion.

The true whip-snakes are not afraid of falling. If you should succeed in treeing one, and with infinite trouble shake it down, it will jump from no matter what height, make a beautiful spiral of itself, rebound from the earth, and then glide away!

Another common feature among arboreal animals is upon the principle of the parachute, a distension of the skin to break the fall. There is a genus of *Ranidæ*, widely distributed from Japan to Madagascar, called *Rhacophorus*, because its many species have an enlargement on the edges of the limbs, or the sides of the body, in the form of little rags or flaps of skin, and a few kinds of flying frogs have the webs between the fingers and toes enlarged to an almost absurd extent, so that they can descend through the air in a slanting direction.

Boas and pythons have short and strong prehensile tails, and the numerous chameleons of Africa and Madagascar have not only a grasping tail, but grasping hands and feet as well. This principle of *prehensile organs* is carried to an extreme in various mammals, of which it is sufficient just to mention monkeys and lemurs, the pangolin and sloth among edentates, the old-world palm-martins among carnivores, the prehensile-tailed porcupines and opossums among marsupials. But the especial home of prehensile-tailed mammals is in the tropical forests of America. There alone live the prehensile-tailed monkeys, a group characteristic of and restricted to America. Nearly all its marsupials are arboreal opossums, even two ant-eaters, *Myrmecophaga tetradactylus*, and the little "mico de noche," or *Cyclothurus didactylus*, as well as *Synetheres mexicanus*, a climbing porcupine; *Cercoleptes caudivolvulus*, the kinkajou, with its indiarubber-like tail-tip, is a representative of the carnivores, although it has become an almost strict vegetarian. All these mammals occur in the Atlantic "hot-lands" of Mexico.

The little flying dracos, agamid lizards of India and Malaya, possess a perfectly folding parachute, with stays furnished by the much-lengthened posterior ribs. In Borneo there lives a tree-snake which, cobra-fashion, although it is not a cobra, spreads out its ribs; it does this to flatten and broaden the body somewhat like a split bamboo, and is said to glide thus, in parachute-fashion, from tree to tree. This principle is carried to extremes in mammals, mostly in the Malayan and Australian forests, examples being *Galeopithecus*, the flying insectivore, flying phalangers among marsupials, and flying squirrels among rodents, while far away from this Oriental centre, in West African forests, lives another flying rodent, *Anomalurus*. They all possess parachutes formed by the enlarged folds of skin between the limbs and the sides of the body. Whilst in Malaya the parachute principle is a "fashionable" contrivance, prehensile tails are there almost absent; the reverse is the case in the American forests, in all of which there does not occur a single advance towards the parachute principle. One feels inclined to appeal to the *genius loci* for the explanation!

Intensely arboreal life leads to various unexpected modifications, and sometimes to limited distribution. Many of such mammals scarcely ever descend to the ground, and if, like the sloth, they cannot even walk on the ground, their chance of spreading is absolutely limited by the continuity of the tree-tops. The same applies to lemurs and the American monkeys. It may be a laborious journey for a tree-frog to descend from his roof-garden to the gloomy basement; moreover, he finds all he needs on the trees themselves. The scroll-like receptacles of leaves and flowers, before-mentioned, hold water, and some frogs use them as nurseries; or they glue leaves together, fill the space with a foamy lather, and deposit their eggs therein, the development of which is so accelerated, that the babies are hatched within a few days as tiny frogs, having dispensed with gills and swimming tail; or the nest is suspended over a pool, so contrived that the next big rain washes the tadpoles into the water; or, they lay only a few large eggs, containing a great amount of yolk, which the male glues on to the female's back, a trick common in Africa and on

the Seychelles. In some Brazilian tree-frogs, to prevent the eggs from slipping off, a slight fold of skin is raised along both sides of the back. In some other *Hylæ* these folds become rather large during the hatching-season, forming a kind of hood—*e.g.*, in the South American *Hyla gœldi*. In a few South American and Mexican *Hylæ* this hood has become a permanent organ, a pouch upon the back; *Nototrema* is such a marsupial frog. It may even be a question whether the mammalian marsupial does not owe its origin to the arboreal life of this early, and still rather primitive, group of mammals.

The tropical forest teaches two impressive lessons: the tremendous, awe-inspiring competition into which plants and animals alike are forced in their struggle for life, and the fact that the fight is so fierce because the physical conditions—plenty of warmth, water, and food—are so favourable to all. Every living thing is modelled by adaptation to the prevailing surroundings, coupled with the cumulative inheritance of the characters acquired.

CHAPTER VI.

SAVANNAHS AND SWAMPS, FROM TETELA TO THE ISTHMUS.

Mateo Trujillo and his Home—Jaguars—Birds—Nearly killed in our Car—Vegetation and Animals of the Lagoon of Aguafria—It is not advisable to assist a wounded Man—Railway Oddities—The Town of San Juan Evangelista—Laziness—*Dermophis mexicanus.*

Our "Pullman car" (V. C. al P. No. 542) was hitched on to a train, and we moved twenty-two miles further south to Tetela. Half-way down, at Acatlan, the railway leaves the sierra and enters upon savannahs. The tree-covered higher ranges remain visible to the west, while to the eastward stretch lower trees, at first still forming continuous woods, but soon diminishing on the plains into scattered clumps, while still further south and east there is open grass-land with clusters of palms and other trees, especially near the rivers, for instance, the Rio Tonto. This savannah district, with its concomitant changes of flora and fauna, is of great interest.

Tetela is an inland station typical of this line; it possesses a station building of the usual dilapidated wattle-and-daub palm-house type, leaning against a more solid structure of wood and brick, with the usual drink-shop. The car was left on the short shunting-track. Tetela, as such, scarcely exists; several scattered habitations in the neighbourhood make up the entire hamlet.

Ten minutes away stood Mateo's house, and as he was such an important person in this expedition—in fact, we, hitherto inexperienced in Mexican ways, could not have brought it to a satisfactory end without him—he deserves some remarks. Mateo Trujillo was a native of Jalapa, in the State of Vera

Cruz, a Mexicano, with some admixture of Spanish blood; otherwise a typical Indian, with the ugly conical cranium, of short and slender build, with a few scattered hairs on his chin and upper lip, and forty-eight years of age. Rather well educated, able to read, write, and figure fairly well, and with a craving for knowledge, he was born a naturalist—a wonderfully close observer and lover of Nature. Since his youth he had,

MATEO TRUJILLO AND FAMILY.

off and on, been employed by various collectors, who preferred enjoying themselves in the towns whilst Mateo scouted for them in the country. But this was, at best, a precarious way of making a living and supporting a family. He said one day: "People in your country seem to think that people in Mexico live on tortillas and a real (2½d.) per day. Look at this postcard which I have recently received." Some shameless dealer from the "Vaterland" had offered him one real per kilogram for Mexican

landshells—snails, mind you—as if such things could be picked up like sea-shells! Mateo had tried his hand at many things, had been boy to a muleteer, pedlar, assistant to a surveying party, a trooper "guarding the coast" under General Diaz, and a traveller and commission agent for the railway. Recently he had settled, with his second wife, at Tetela, and we had engaged him for two pesos per day, besides his keep. Above all he was scrupulously honest, always cheerful and willing; he became very much attached to us, and, above all, he adored "la señora." Many a time, when things looked black, he worked and worried until he had put them right, and it was a lesson to see his methods of enlisting the help, and gaining the confidence, of the most reluctant natives. It was a joy with such a companion to prowl about, watching bird or beast in its haunt, or to sit by the camp-fire exchanging confidences. He spoke nothing but Spanish, with a smattering of Aztec, and he liked using foreign terms, such as "idioma," "equilibrio," "recapitulacion," which he then translated in an aside into the vernacular for my benefit, saying: "This is a rare and difficult Spanish word you may not yet have come across." Alas, that this has all to be written in the past tense! Poor Mateo! Maria, his wife, kept the house clean and in excellent order, and the two little children, a boy and a girl, were trained not to cry, and if there is anything, above all, likely to drive one out of an Indian's hut, it is the importunate, angry crying of their babies.

A house like Mateo's is not over-furnished. Bamboo lattice-work screens off the sleeping apartment, with either a folding bedstead or more often a "petate," a plaited mat of rushes or grass, laid on the ground. When the woman receives friends, or does some sewing, other "petates" are laid down. The hearth in these Eastern States is invariably raised to a convenient height above the ground by means of a fixed, table-like, wooden structure supporting a thick layer of clay, upon which is built a fire. A "soplador," or fan, neatly plaited from palm-leaves, a very large, thin, and extremely brittle "comalli," or unglazed earthenware pan for roasting the tortillas; a "metlatl," or grinding-block, a "metlapil," or

cylindrical grinder, for the Indian corn, and a smaller pounding-stone for capsicum chilies, are all the necessaries found in the poorest hut. The horses' trappings, beautiful "mantas" and "zarapes" attract the eye, but the women's embroidered garments are kept out of sight, being hidden in bags which are suspended from the rafters, so as to be, like everything else, out of reach of the ants, termites, rats, and other vermin. The fowls roost where they please; and during the heat of the day the people lie in their hammocks, slung from the beams of the verandah. None of these houses have windows, and few have proper doors.

The people suffered much from malaria, and Mateo's servant was in a deplorable condition. The stuff which is sold as quinine at the haciendas, or factories, is worthless, like all the other drugs obtainable here, and shamefully expensive. We gave the man, a mere wreck as he was, a staggering dose, dissolved in a cup of wine with sugar; he promptly curled himself up in the shade, slept for nearly twenty hours, and then came to do us a good turn. He had been appointed water-carrier, but we did not like the lukewarm and turbid fluid that passed under that name, and whilst he was so ill I had found a little well with much cooler and clearer water. "You lazy fellow, you got this muck from the brook where all the filthy cattle drink." "Yes, my chief, but in the well lies a dead 'tlacuache' (an opossum), drowned there as many mice have been before it. Nunca busce V. agua de un pozo" (Never take water from a well)! Mateo was more philosophical. "Sr. Don Juan, I have repeatedly warned you that all water is bad except that of the sierras; ah, what water we had at El Pico, at La Barbara!" He meant well, but did not go so far as the well-known Hungarian, who said: "Water is bad enough when its gets into one's boots; imagine what it must feel like in the stomach!"

The fauna and flora of Tetela, at an elevation of about 1,000 feet, are both thoroughly tropical, but of the drier savannah-like types. The rains are said to be very heavy, but during our visit, in the month of August, a few consecutive rainless days sufficed for the tributaries of the Rio Tonto to

empty themselves; they were then three-quarters dry, a mere succession of very deep pools connected by long and shallow rapids; only their banks and the hollows were densely wooded. A conspicuous landmark was a ceiba tree, or *Bombax*, a veritable giant, with a big hollow which reached perhaps for forty feet up the interior of the smooth, branchless trunk, before this latter began to spread out its great limbs. It had been set on fire many years ago, at which time many bats were reported to have issued from it. We therefore made a big bonfire of dry palm-leaves, which soon blazed and roared up the funnel, and then made a smoke by burning mould and grass, but the result was disappointing, only a few bats being caught; they were, however, vampires, the real bloodsucking *Desmodus*. Several armadilloes were caught with dogs, the natives tracking them to their burrows, whence they were easily dug out.

During the first night all the dogs in the neighbourhood were barking, and the cattle were lowing uneasily in a peculiar way, just because a jaguar was on the prowl, sometimes near enough to the car for us to hear the coughing, snorting, sniffing sound that he made. Information about the habits of these beasts was contradictory and puzzling. At Motzorongo a jaguar was slain by natives while in the act of tearing down a cow, in full view of the house and in broad daylight. Here at Tetela it was: "Oh, no, he never takes cattle, nor does he attack people, as he does not live here, but in the forest, on the slopes of the distant mountains; he is quite harmless, since there he has plenty of game in the shape of stags." "Why, then, does he ever come here?" "He always comes to the farms during the night, hoping to catch a dog, which he prefers to anything else. He also takes pigs." "Does he ever break into your houses?" "Never, unless pigs, dogs, or fowls are inside." But as these are allowed to sleep in most houses "because of the jaguar," the information works back to the starting-point as usual. It is curious that the jaguar is so fond of dogs, just as the leopard is said to be in Africa and India; but leopards, panthers, and jaguars are really the same animal, the most successful of tropical cats, and hence cosmopolitan, each of the three great continents having its own form, the

Indian panther and the African leopard distinguished from each other by fancy alone, the American jaguar from these by the absence of a central spot in its "rosettes."

A few miles south of Tetela was a large cattle ranch owned by a strongly-built, tall, white-haired and venerable-looking negro, with stately manners, like those of his "official" wife, a wizened, but rather awe-inspiring, old lady. We visited him to ask permission to search his lagoon.

The old gentleman was reputed to be very wealthy, both in cattle and children; of the latter alone he had thirty-three, boys and girls, the minority, of course, being children of the wife. This was the secret of the patriarch's success, his many children being employed as farm-workers, and in absolute subordination to him. The whole district goes in for much breeding of cattle and horses, but the difficulty was the then still unreliable condition of the railway—though it was built for the very purpose of conveying cattle to Vera Cruz, for shipment to New Orleans. The ranchman had much to complain about.

One of the elder of the many sons, and a younger brother of the patriarch, both dark-brown in colour instead of black, took us to some of the pools, where they stripped and waded up to their necks in the water, "feeling for crocodiles and tortoises" with little success. But we saw other creatures. Big iguanas plumped into the water with a loud splash; "pasarios," or basilisk lizards, scuttled across, a graceful snake-bird took a header from its favourite perch, and there were baby iguanas which astonished me very much, emerald-green little beauties, not yet five inches long, even if we include their long tail; they were sitting in the high grass and reeds, whence at the first alarm they dived into the water, and went to the bottom in a slanting direction, propelled only by their wriggling tail, their limbs being held back just like those of newts. The adults are arboreal and aquatic. On another occasion in the same neighbourhood, where guava trees overhung the then dry river-bed, the ground was thickly splashed with the dung of these great lizards, which had been browsing upon their favourite food, the leaves of the guava-tree, the

fruit of which yields the famous jelly. Our new friend, although he had really exerted himself, gracefully refused any reward, intimating that it would be more appropriate for us to have a smoke and a talk. Assuredly, he was one of Nature's gentlemen ; after having seen us half-way home, he invited us " to breakfast with the family " for the morrow, when his " papa would be very pleased " to see us.

THE TETELA RIVER.

In the morning and evening numbers of long-tailed, prettily-coloured cuckoos, or " piaya," became extremely noisy. They were a most cheerful and playful lot, although their cries, something like " Pia-pia-piayaah," often sounded like those of someone in dire distress. Parrots were mainly represented by the yellow-headed *Chrysotis*, which kept fairly quiet, as did some of the solitary kingfishers, *Ceryle americana*, and the large *C. torquata*, both of which sat, as usual, on a barren branch above the river, or hovered in the air. Ever-present in

grassy parts of the Mexican "hot-lands" are the "garrapateros" (*Crotophaga sulcirostris*, of the cuckoo tribe), funny-looking birds, entirely of a dull, coal-black colour from the high, strongly compressed bill to the feet. They are odd in various respects. The long, thin-looking tail is composed of but eight quills, the smallest number in any known bird; they build a big nest in company, several females combining to fill it with their eggs, which have blue shells, covered, however, with a white chalky matter. The latter often gets partially scratched off by their feet during the period of incubation, which also seems to be conducted upon queer principles. The natives said that several birds sit at the same time, while others perch upon the margin of the nest, waiting for their turn. It is usually stated that these birds pick the ticks off the cattle. This may be the case; our own experience is that they often rest upon the backs of cattle, but we never saw any picking done. When the cattle were grazing, one or more of these "savannah blackbirds" usually stood a yard or two in front, to pounce upon the insects, mostly grasshoppers, which the cattle happened to stir up. They were most in evidence during the broiling heat of the day, which they seemed to feel greatly in their black dress, to judge from their panting, and the opening of their beaks as they sat upon the fences. Not at all shy, they rather seemed to take an interest in the passer-by, flitting from bush to bush along his track, now and then mewing like a kitten, or making a harsher double-note when alarmed. Little hawks of various kinds were surprisingly confiding, and far less wary than the black "tilcampo" lizards (*Ctenosaura acanthinura*), which basked upon hollow branches, but, when they saw us approach, although still thirty yards off, crept at once into their holes, forgetting, as usual, to withdraw half of the long, serrated tail.

Not far from Tetela, not more than half-an-hour in a bee-line from the station, is a small pyramid, about twenty feet high. It is a terraced structure, with steps leading to the top, but densely overgrown with trees, shrubs, and a tangle of weeds. This pyramid is still unexplored and "unknown"; but the men who built the railroad had other things in view, and the

natives have learned from experience that letting the authorities know of such monuments brings trouble in the shape of much ill-paid labour, besides confiscation of objects found, and beyond such reasons there is always some superstition lurking in the Indian's mind. An active "jefe politico," or commissioner of the county, now and then annexes a "find," and sometimes sends it to the State or the National Museum, unless it is smuggled out of the country; but the natives get neither credit nor reward, since, according to law, "prehistoric objects" belong to the Government, and "idolatry" is forbidden.

Our next move was fifty-eight miles further south, to Aguafria, a mere community of scattered habitations. The whole Trujillo family was invited, as Maria had relations in that place, and cherished the idea of paying them a surprise visit. Therefore my wife and I had the car to ourselves, and this was literally shunted into the bush, away from both huts and station. The first night we went within a hair's-breadth of being finished off. As we lay sweltering under the mosquito curtains, we heard, in the middle of the night, the puffing of an engine, and before we were quite awake there was a terrific bang, and camp beds shot against the end of the car, and tins, bottles, and canned preserves, which had been neatly arranged on the shelves, flew about like canister shot. The engine of a belated goods train had charged into the car! I shouted in the dark, and tried to climb out by the open door, but the engine came on again, and I had just time to fling myself on to the bed, and hold tight, when the scene was repeated, with variations. A native with a lantern who went past, said they were "only shunting"; one more shunt and all would be right. "Shunt" they did, and I am very sorry that I did not hit the brute whose fault it was; but at least my well-meant attempt drew the attention of the driver, who came along with another lantern to search beneath the car for the person "supposed to be run over." He was beside himself, poor man, when he understood what had happened; his revolver was out in a twinkling, and he blazed at the shunter, but the fellow escaped, and was never seen again. He had only

to present himself at another station to be taken on again, with the loss of a few days' wages.

Of course, the station-master had given no warning of the existence of this "private car" on the side track, but the knowledge of it soon spread all along the line. To make really sure, we made friends with another man who knew how to prevent any repetition of such attacks; every night he laid two sleepers across the side track, one above and another below us, and both a good way off the car. "That," he said, "would prevent any engine from coming too near!" The interior of the car was left in a state of heartrending confusion. Every box, including the barrel with the boas, had toppled over, the water-buckets were upset, curtains torn, and we thought it better to leave further inspection until the morning, when Mateo came and gazed at the wreckage.

It generally rained, with heavy thunder, during part of the night, and the early morning hours were delightful when the sun lighted up the scene, the refreshed vegetation, still dripping with moisture, and almost visibly unfolding new leaves and flowers in its tropical exuberance. Parrots, always in couples, chattering and never forgetting to answer each other, crossed the sky overhead, pair after pair going in the same direction, and returning an hour before sunset in the same manner to the hills. Toucans alighted on a tree close to the car, and hopped about in their own amusing way, these almost voiceless birds communicating whatever they had to say by means of quaint movements of their huge, but light, beaks. Large *Cnemidophorus* lizards went seeking about on the ground; trogons cooed, and motmots uttered their "hoo-too-hoo-too" in the denser parts of the jungle. Our toucan-tree, a large-limbed oak of some kind, was specially favoured by our visitors. Luxuriant phyllodendrons and vanilla plants had found their way up the bigger branches, and several kinds of bright orchids grew in clusters, together with a fine specimen of the most extraordinary-looking kind of bromelia (*Æchmea laxiflora*), while a climbing *Cereus* unfolded its white, yellow-centred, blossoms at night. We could even watch the very process: how those spots of white gradually appeared and grew large

in the dark. They looked lovely amongst the verdure at sunrise, but a few hours later they visibly flagged and were soon no more.

Until 7 a.m. life felt vigorous and full of promise, and a great programme was made for the day. An hour later the shade felt agreeable; by 9 a.m. the sun had become unpleasant, and soon the last trace of the morning freshness had been overpowered by the heat of the day, and life appeared to be in a state of suspense. Things became lively and noisy again in the late afternoon; but the world, somehow or other, had an aged, tired look, and the rapid closing in of darkness was only welcome as bringing relief from the merciless sun. The evening hour was spoiled by the insect pests which, one after another, made their appearance; not all at once, but first one kind and then another giving ample employment to the victim; "zancudos," or big flies, mosquitoes of all varieties, "chaquistles," and the microscopic flies called "jejen," the last-named being the worst of all. They considerably added to the troubles of the night, which, instead of being a time of rest, proved to be one of exhaustion.

In this low-lying district, about one hundred feet only above sea-level, and consisting of a mixture of forest and swamps, with a sluggish river, creeks, and lagoons, the air was as saturated with moisture as that of an orchid-house. Clothes, already wet with perspiration, remained damp, and the limp mosquito curtains shut out every breath of air, which sent the pattering gusts of rain into the car through the sliding doors, which, of course, were kept wide open. Our increasing menagerie, so quiet in the day-time, became restless. The armadilloes and tortoises scraped and scratched, the boas tried with all their combined strength to lift the lid, and Mateo, who ought to have been well seasoned, tossed about with fever in his body. The mosquitoes were of the dangerous kind; with blood-swollen abdomen and long legs stretched out behind them as they were found in the morning sitting on the walls of the car—an uncomfortable warning that the fever-devils were about. Yet we escaped; a small dose of quinine dissolved in a cupful of white wine or lemon juice, with enough

sugar to hide the bitterness, and taken in the early morning, an hour before breakfast, is a drink fit for the gods, and is death to the fever germs; it enables an otherwise healthy constitution to grapple with the fiend before he can assert himself.

The site of the village of Aguafria had been selected on strictly scientific principles, so as to secure the maximum amount of fever for the inhabitants! The palm and reed-built houses were scattered around the margin of a large pond teeming with insect life, and shallow surface-wells had been sunk in the sodden ground. A log, half floating in the pond, was the favourite basking-place of the village crocodile. Plenty of smaller specimens lived in the ditches along the railway embankments. When pursued, they made for the deeper parts that were free from weeds, stirred up the yellow water, and hid in the mud at the bottom, where they lay close; the only way of finding them was for the men to wade in, feeling for them with their feet, and prodding at random with their twelve-foot bamboo sticks—pointed with ten-inch iron spikes—their usual "fishing-rods." During the night the crocodiles roamed about in the forest, in search of new pools when their old ones had either been fished out or threatened to dry up. The railroad proved a veritable trap to them, as the bleaching bones of slain specimens showed.

The Rio de Aguafria, or "cold river," owes its name to its source, a deep hole, out of which the river, as if ready-made, wells from beneath the overlying limestone. It soon becomes a mere series of lagoons and creeks, with steep, muddy banks, amongst brushwood and forest.

Some navvies were mending a small bridge on the railway; instead of replacing the broken crossbeams, they had built a crib, and as this sank the gap was filled up with boards taken from a wooden box, and with the stem of a palm-frond! This sample of engineering skill was, of course, not visible to the inspecting party who, on the following day, rolled merrily over it in their observation car, but it set us musing as we embarked beneath that bridge in a dug-out canoe. The thing was horribly unsteady. My wife was perched in the bows, whilst I

was kneeling on the muddy bottom in the stern, a position which drew from the fisherman the remark that I was in the proper position for doing penance. To shoot from such a rickety craft was to court disaster ; one could not even laugh in it, and there was soon so much to see, more than enough, indeed, to excite us. From the overhanging boughs great iguanas fell with a

THE FIRST IGUANA.

splash, some of them at least five feet long, and heavy enough to upset us if they had fallen into the canoe. Others crept stealthily through the brushwood, and, on reaching the water's edge, looked round with their large, quiet eyes before they slid into the shallow water, and walked along the bottom.

The captain refused to punt us into the large lagoon ahead, for fear of our being upset by some frightened crocodile. There certainly were both crocodiles and alligators, very big

skulls of either sort lying about, the living monsters themselves being far too wary to do more than show their heads and emit grunts. We therefore landed, to flounder across a flat of about two miles in extent, which had been recently inundated to a depth of five feet, as was indicated by the masses of dead weeds, and the grey, dried-up mud on the shrubs. These latter were low but thick, and grew in clusters, consisting apparently of some kind of "cuautecomatl," or *Pseudosmodingium*, whose foxglove-like, white blooms, proceeded from the very branches, and exhaled a sweet but sickly smell; the fruit resembled green apples, and the bark was beset with spikes. Up to about the height of a man, the trees and shrubs all looked like dead wood, since they were coated over with mud, and the ground was one brown mass of slime, with here and there a pool of hot, brown water, and wherever such a pool was overhung by shrubs, iguanas plunged in or rustled through the tangled roots. The young, which retain their vivid green coloration until they reach a length of fifteen inches or so, alone were less timid, and allowed us to approach within three yards distance, keeping their large black eyes wide open. If we came yet nearer, they ran through the brushwood as to the manner born.

At last appeared the lagoon, now only a few hundred yards across, though several miles long; one side passing gradually into sticky, hot mud, relieved by patches of grass and reeds, the other side forming a picture of tropical forest in all its glory. The slightly-rising ground was covered with a dense jungle of oak, palms, and many other kinds of trees, right down to the water's edge, and all the luxuriant verdure turned as it grew towards the open space, thus presenting a rare and, as it were, a bird's-eye view of the outside of the branch-canopy with all its blooms. Majestic, though decaying, trees were the resting-places of many birds, amongst which both large and small egrets, in resplendent white, shone out conspicuously from the green background. There were also grey herons, little dark herons, greenish-coloured bittern, and pink spoonbills, or rather white spoonbills with a tinge of pink, and with carmine-red upon their shoulders. White, curve-billed wood-ibises,

with black wings and red eye-wattles, gyrated and croaked overhead, and in the midst of all this lovely bird-life, falcons perched stolidly on the same palm-fronds as the little egrets. The sight was lovely, one, indeed, not easily forgotten, and the reverse of the medal was memorable for different reasons: for the suffocating and glaring heat of the noonday sun caused the fermenting mud and vegetable rubbish to ooze and rise in evil-smelling bubbles.

These lagoons must be teeming with fish. How can they otherwise produce and support such numbers of huge crocodiles and alligators? No doubt many a stag and tapir, of both of which the spoors were plentiful, was dragged into the water by these reptiles as they lurked at the drinking-places; yet they can scarcely form the staple food supply. It was aggravating to hear the fisherman talk—from Tetela to the Isthmus—about the "huge, pale, water-tortoises" called "galapago," or "tortuga blanca," which is the usual name of the vegetarian tortoise *Dermatemys mawi*, but the size of this creature is not known to exceed a shell-length of ten inches. We were rather unlucky with our tortoises; plenty were visible, even in the ditches near Aguafria, but somehow or other they managed to escape, with the exception of some slow-paced *Nicoria*, which lived in shrubberies, and *Cinosternum leucostomum*, which, whether on land or in water, shut themselves up and appeared like waterworn stones. Snakes, mostly arboreal, were beyond reach, except the pretty green and yellow mottled *Drymobius margaritiferus*, perhaps the commonest kind in the hot countries on the Atlantic seaboard.

"Ameiva" lizards and *Cnemidophorus guttatus* being, as forest dwellers, spotted and sombre of colour instead of sharply striped, were abundant. Of amphibians it was interesting to notice down here the little *Hylodes rhodopis*, the same kind which flourished on Citlaltepetl; and the absurd-looking *Rhinophryne dorsalis*, here called "poche." This toad, confined to hot countries on the Atlantic, is ugly in shape, its narrow snout protruding, while its short legs can be drawn up into its flabby, oval-shaped body, the loose, baggy skin being rolled back in the process. This harmless creature is dark

brown, with a yellow or orange stripe along the spine, and smaller spots and patches; being of retiring and nocturnal habits, it excavates a small hollow in moist clay under a trunk, and it lives mainly on termites and similar small fry, which it licks up with its long tongue.

The boys of the neighbourhood were bright-witted, and soon grasped the situation. Small change being scarce in this shopless neighbourhood, they formed a syndicate of eight, elected a spokesman, and appointed me treasurer and keeper of accounts, after having ascertained the current value of the various animals. At first this was no easy matter. "Quanto pagará por un poche, zumbîchi, cachúmbo?" This question, "How much will you pay?" could not be answered until they actually brought me their toads and lizards, and thus taught me the native names of the *Rhinophryne*, *Ameiva*, and *Cnemidophorus*. But they were the most reasonable little fellows, expecting more only for what was rare and little for "un de los corrientes," one of the current things. They caught most of the lizards by shooting them with bows and arrows with a knob of indiarubber at the tip of the arrow, so as scarcely to stun and not to injure them. When they came to the car towards sunset, the spokesman first pointed out that so-and-so did not belong to the combine, and would have to be dealt with separately. Then followed the valuing, counting, and apportioning of the pay, and the result was most satisfactory, as not only did these boys continue to trade, but several men wished to enlist, amongst them a "cazador," or hunter. Thus trade became quite brisk, and Mateo got his hands full with preparing these specimens, in addition to the small animals that he himself trapped.

These boys brought me armadilloes, the "nasua," or "tejón pisotl," the "tejón solitario" (*Procyon lotor*), black and red squirrels (*Sciurus aureogaster*), several kinds of "tlacuaches," or opossums, the four-toed antbear (*Myrmecophaga tetradactylus*), here called "brazo fuerte," or "strong-arm," which lived in the palm-trees, curled up in the dry clusters of the fronds, securing itself with a turn of its prehensile tail around a stalk, and further grappled to the spot

by its claws. These, like its arms, are powerful, and the animal uses them for opening up the nests of the arboreal termites, which are as hard as stones, whence he is also called "oso colmenero," or "bee-hive bear." Such and similar animals were considered of little value, whereas a large "perro de agua," or water-dog—*i.e.*, otter (*Lutra felina*)—cost as much as four pesos, although it was not obvious why they should so much esteem its fur in that sweltering country. All we could learn was that the long hairs are laboriously plucked out, leaving only the soft under-fur.

As usual, there were other creatures which one longed for and could not get. For instance, instead of the common long-tailed deer (*Cariacus toltecus*), which carries three prongs, we wanted the little black-faced brocket (*Coassus rufinus*), which grows primitive antlers up to, but not beyond, the pricket stage. This diminutive deer is essentially a forest-dweller, and is not often seen, whilst the other deer is plentiful in the lowlands as well. These deer assemble during the periodical inundations on the slightly higher, isolated knolls near the coast, for instance, near Alvarado, where they are slaughtered by the hunters without mercy, the skins being paid for at the rate of twenty-five to fifty centavos, for shipment in quantities, with great profit, to New York, where they are turned into the finest doe-skin leather.

Above all, we longed for a tapir, called "danta" in Spanish, but also "anta," whence has arisen the term "ante-burro," further corrupted to "anti-burro," or "opposition ass," whilst "ante-burro" might, by popular etymology, be explained as a "previous" or "early" donkey, which would make ridiculously good sense, since tapirs are zoologically generalised three-toed equines which have stuck in the mud. A few "ante-burros" are generally to be seen in that abomination of a "zoological garden" at Chapultepec. On enquiring whence they come, the invariable answer is "Oaxaca, del monte." But "monte" does not mean "mountain"; it is Spanish for "low forest." Hence has arisen the notion that this kind of tapir is an inhabitant of the mountains, and as it so happens that in Peru there lives a

Tapirus andinus, this, its Mexican relative, has been promoted to the high sierras of Oaxaca. In reality, he does not live on the mountains, but only in the tierra caliente, in the tropical lowlands. At Aguafria the tapir was plentiful, to judge from the spoor, but it was hopeless to get at him in the swampy forest; the time to hunt him was said to be the dry season, when these semi-aquatic creatures collect at the permanent lagoons, instead of roaming far through the forest.

To make our presence, or rather, that of our car, known to the engine-drivers, we kept a look-out for the occasional arrival of the trains. The station-master was a good-humoured, but utterly lazy and incompetent person, who spent most of his time sleeping in his shanty. Theoretically, he was in charge of the "post office," which consisted of two cigar-boxes, one for delivery, the other for such letters and memoranda as the conductors might deposit. Unstamped letters he refused to receive, whereas he relieved of their stamps those that had any, in which act, however, he only conformed with general custom. I was made free of his office, to rummage for possible letters, whilst he was lying on his back, and no wonder letters get lost in those out-of-the-way places. We only once fell out seriously, when he would not send a telegraphic message to Cordoba, and I threatened to operate myself. In spite of groans and curses he was compelled to keep on repeating it, until at length the man at the other end became angry, and we got a forcibly expressed, but satisfactory, answer. The point in question was to make sure that an eventual notice to move our car should be obeyed. We had not yet established intimate relations with the various train officials, but this came about in a most unexpected manner on the following day.

I had just walked up to the station, to which I was attracted by the sight of a little crowd. The object of interest was a horribly-mutilated "peon," or workman, with a crushed foot, and the whole of the skin of his hand torn off, and hanging in flaps from his fingers. How, and when, and where this had happened, I know not; on the contrary, I was repeatedly asked this question by every official. Possibly the man had been

crushed by one of the stacks of firewood. The engineer readily promised to keep the train whilst I fetched our emergency medicine-case. If I enlarge upon what followed, and put myself in the centre of the stage, it is not with the intention of showing myself off to advantage, but of throwing a lurid light upon the conditions which prevailed. The wounded man kicked, yelled, and bit during the process of dressing his wounds, and not a man lent a hand, although the office, and the entrance to it, was choked with sightseers; only the station-master's wife brought a basin of water. When this business was finished, everybody fled; most of them jumped into the train and banged the doors. I myself had to carry the man round to the other side of the train. One woman, an old negress, helped me in, and we deposited the patient upon one of the long, central benches; this was vacated as if by magic, men, women, and children craning their necks over from the other side to look at the patient. Outside, in front of the engine, the policeman, armed with a cavalry sabre and a revolver, stood and smoked; one of these fellows rides in every train. I charged him to take the patient to the Cordoba Hospital, and to see that he got some refreshment during the long journey. The only reply was: "Has he got any money?" The conductor was nowhere to be seen, but the American driver said he would see after the case at Cordoba, and we parted, he to make up for the long delay, and I to go to our camp, not in the best of tempers. Mateo joined me with beaming smiles, and my anger vented itself upon him. "What, you here . . ?" "Yes, sir, I stood in the door, but I saw it all, and you did grandly; yet it would have been wiser to leave that man alone, because it is not known how he came by his dreadful injuries. Que disgracia!" Little by little I learned that I had committed a rash act. According to Mexican law, the first person who is found with, near or touching a wounded man or dead body, can be arrested, and he generally is arrested, if for no other reason than that he might be a possible eye-witness. The result is that the victim of an accident, or of a foul deed, is shunned, and in a street the people run away to a safe distance. That policeman could have carried me off, as he

found me bending over the wounded man, when the train arrived at the station.

However, no ill, but good, resulted ; the engineer had spread and magnified my name along the line, and when, a few days later, we moved on to Perez, I was pointed out as " the man who cut off the peon's arm, who threatened the policeman, and who likes camping in the most God-forsaken swamps."

Nearly all the engine-drivers and conductors of the Mexican railways are Americans or Canadians. The reasons are obvious enough. Experience has shown that when a small accident happens—and these are frequent—the Mexican would wire to his nearest headquarters and wait for instructions, whereas the white man would take his screw-jack, and commandeer help, and at least try to settle the matter himself. It is not so much a question of laziness, as want of initiative, and the shunning of responsibility. There are exceptions, but it is not the best-class of American who goes to Mexico, and the further he drifts from the base, the less satisfactory is his previous record likely to be, and many of those who have slipped off the plateau, and have got stuck in the southern " hot country," are a sorry lot.

Still, after getting to know them, I have received much help and many acts of courtesy from both engineers and conductors. One of them provided the only fresh meat then available, as he had run over and killed a bullock on the line. On such lucky occasions the natives swoop down upon the carcase like vultures, divide it, and nothing is left to bear witness except the horns and hoofs, which in this case, fell to the engine's share. " Where does the owner come in ? " " That's just it : if he does come in time he claims his beast, and probably claims damages, too ; but if he doesn't—well, that simplifies matters, as he can't prove the kill." This running over of cattle and donkeys—mules and horses get out of the way—is a fruitful source of litigation, and still more frequently of " accidents " to the trains, for the dissatisfied owner bears a grudge to the company, and a little accident, a " desgracia," is soon arranged. It may be a false report, but I heard of the manager of one railway who preferred travelling by the opposition line rather

than by his own, since he had received a warning that his uncompromising attitude in settling "run-over" claims had marked him as a candidate for an accident.

We had to leave Aguafria owing to funds running low; so many things had been bought, and so many more were offered daily, that the currency threatened to give out long before Tehuantepec.

Perez, on the left-hand bank of the Tezechoacán, a big

JUANITA.

river, did not prove an inviting place, although it is a regular station, with a proper house for the railway officials, and is also the terminus for the little steamers which ply to Alvarado. There were, however, too many mosquitoes and fever-stricken people. Thence the railway was in splendid condition, and the train flew across the level or slightly undulating savannah—a rich grazing country—until the few scattered huts were reached, which represent Juanita station. Intending passengers for the Isthmus railway could travel further yet, to the junction at Santa Lucrecia, but there was a gap of an uncertain number

of miles of unfinished railroad, in which we should surely have stuck with our baggage. The alternative was to go from the little Juanita, across open country, to the big Juan Evangelista, and then by a branch of the Isthmus line to Juile Junction. For the present we decided to await events, and have a day's look round in the pretty neighbourhood, which consisted partly of sandy and pebbly ground, but also had very fertile, green meadows—unmistakable dunes and old seashores—covered here and there with dense clusters of mimosa and spiky "cuautecomate" trees, with climbing cactus and many orchids.

So far, the fresher and drier air was an agreeable change from the stuffiness of the swampy forests; but all day long there was absolutely nothing to be bought at Juanita, not even tortillas, and nothing to drink until, at night, Mateo, having made a last attempt, came back radiant with a heap of crisp tortillas, several bottles of beer, and, oh, joy! two pieces of ice, balanced on the rim of his sombrero. There was a mystery about the bottles, which had to be returned the same night, when done with. Mateo had much of the wisdom of the serpent. "Let us see whether this beer is good; to-morrow they will be very busy at the station." The man in charge was a negro of business-like intelligence, and with feelings of responsibility. He had only arrived on the previous day, his predecessor having decamped, leaving the station to look after itself: he had sufficient reason for thus vanishing. Two boxes with beer had arrived, consigned to a farmer in the neighbourhood. The station-master had calmly sold it "in retail," stipulating that the empty bottles with the corks should be returned to him. These he put back into the boxes, and forwarded the invoice to the consignee, who had sent for his goods. Only one box was delivered, the other "had not yet come in." The farmer, discovering that his much-looked-for bottles were all empty, rode up to the station and found the other box in the office, minus the bottles. Everybody was sorry for the station-master, duly returned any empty bottles they might have, and felt grateful to him for the treat.

The natives were a lawless lot, and made attempts to break into our car, even in the daytime. Several skins and heads had

been put on the top to dry, and to get rid of the unpleasant smell; in the dead of night the patter of naked feet on the zinc roof awoke us. Whilst I kicked at an arm which was reaching in by one of the doors, Mateo climbed out through the other and up by the hoops outside, in order to chase the two fellows on the top, flourishing his revolver (which I had carefully filled long ago with empty cartridges), and saying in his beautiful idiom: "If you up yourself again, I down you with lead." From Cordoba southwards the officials and many local passengers carried revolvers. From Perez to San Juan, and on the Isthmus line, every other man had one, mostly for swagger, though partly from mutual distrust. The genuine natives were quite sufficiently armed with their "machetes." Suspicious, and easily taking, and resenting, offence, these strangely-minded people, themselves being inveterate liars, never believe what you say, and yet are most easy to bluff. I have been hustled once or twice when quite alone and unarmed, buying provisions rather late after sunset, and then I have calmly told the fellows to carry my load, and this baffled them so much that they cheerfully consented. Except for the larger towns, mines, and railways in construction, where they come much in contact with the white man, and most of the latter foreigners whom they have learned to distrust, the natives are perfectly harmless and possessed of good manners.

A stage-coach conveyed us and the baggage from the little Juanita to the big San Juan Evangelista, for an exorbitant sum. It was a lovely drive of a few hours through park-like grassland, with little brooks and forest fringing the big San Juan river. The ferrying was done by an enormous dug-out, each person and big bundle paying one real, while the horses were whipped into the river and swam across. The town on the opposite side looked lovely; it lost much on nearer acquaintance. It had several inns, one run by Carmelita, an old woman who cooked good food, but the room, or rather sleeping accommodation, was horrid. Several foreign agents and our friend the stage-driver, boarded and lodged there, and, occupying the only available rooms, did not add to our

happiness. They were so inquisitive, and probed us with questions about indiarubber, cattle, enamelled ironware, logwood, and many other trades, all of which they said offered no chance. When they heard that our branch of trade was big snakes, to set up a menagerie, they saw to it that most of our baggage was stored in the backyard, although Mateo tried to convince them that we were only beginners.

The town, founded in early times by the Spaniards, is well laid out, with wide streets, a very large square, and another

SAN JUAN EVANGELISTA.

round the double-towered church; green turf covered the hard, sandy soil, and everything looked airy and fairly clean. Most of the low houses around and near the square are built of brick, further out the streets lose themselves in the usual labyrinth of gardens, cactus fences, and scattered palm-thatched huts. The people, who are rather good-looking, with a strong admixture of negro blood, have a bad, quarrelsome reputation. Dark-skinned women walked about in flowing garments of many colours, with gardenias and other bright and strongly-scented flowers in their somewhat short and slightly curly hair. As usual, the pure negroes have been completely absorbed. The talk of the dangerous disposition of the inhabitants seemed mere fancy—at all events, on the

two nights we spent in their town they were models of good behaviour, but we can testify to their almost incredible laziness. The station-master, himself a native, and I became friends, and as he was very hard pressed to get some navvies to patch up a bit of his railway, we went together to inspect the labour market, as represented by some dozen able-bodied fellows, lying on their backs and smoking in the shade near the jetty.

"Holla, Locadio, how do ?"

"Thank you, jefe, I feel myself very well ; hope you feel the same ; your servant."

"I am glad of that ; but you seem to have no work to do."

"Thanks to God, I have not."

"I could let you have a small day's work at that wash-out, nothing serious, you know ; it could perfectly well stand over for a day or two ; but they worry me so, those white inspectors, always in a hurry ; yet I should like half-a-dozen men. Will you come ?"

"No. What pay ?"

"Two pesos for the rest of this day."

"Oh, not to-day ; and then for three pesos, just as last time."

"But that was for a full day, Locadito ; however, all right, three pesos for to-morrow."

"Oh, not to-morrow, pasado mañana" (the day after to-morrow).

"Loco ! Madman, why not to-morrow ?"

"Jefe, what a trouble you are ; you yourself paid me three pesos last week ; well, I have still four reals in my little pocket, and now one wants to on-rib himself (lie on his back)—I am going to sleep."

This is a faithful sample of the negotiations which the station-master had to give up as a bad job.

* * * * *

We had traced an iguana into the big tree in the back-yard of the inn, and Mateo offered a passing boy a whole real (2½d.) to climb up the tree. The offer was refused curtly. Did he want more ? "No !" Nevertheless, that lizard excited us. We had just photographed, and then caught with a noose, a young one, about ten inches long, which was still bright green ;

it was at first seen on a bare branch, and when it saw that it was observed, it slowly moved on to the leaves of the mango tree, and then sat quite still. In the tall mango tree close by was a large adult (*Ctenosaura acanthinura*), and this was likewise quite green, instead of a patchy brown or black, like those we had known hitherto. Although we climbed the tree ourselves, and spent a long time in looking for that big fat creature, whose size must have been more than four feet long, it gradually vanished before our eyes, mingling to perfection with the surrounding foliage, for there was no hollow for it to slip into. Later on we found that here on the Isthmus, amongst the more luxuriant and permanently green vegetation, most of these lizards retained their green dress, in adaptation to locally prevailing environmental conditions. The young one in time became very tame, and lived in a cage in a greenhouse for nearly two years. During the first four months it ate nothing, and became lamentably thin ; then it made up its mind to acclimatize itself, cropped the young leaves off the geranium plants, took to mealworms, cockroaches and earthworms, and developed a great liking for dandelion blossoms. Meanwhile it had become of a dull green, and had shed its skin successfully, but remained dull ; after several months, having become quite supple, it developed brown and blackish patches, all traces of green disappeared, and it gradually assumed the coloration which is usual in those specimens which have to live in less brightly green and shady surroundings.

Meanwhile, however, there were other little excitements in the zoological line. On the sandy shores of the river flitted about the small, sharply striated *Cnemidophorus deppei*, already met with on the open savannahs of Juanita ; in the mouldy ground of the jungle lived *Dermophis mexicanus*, the only representative in Mexico of this group of worm-shaped, limbless amphibians. As all their relations are native to South and Central America, but do not extend either into the West Indies nor to the Galapagos Islands, it is fair to assume that this creature has managed to travel over at least 1,500 miles of ground since the close of the Miocene epoch, *i.e.*, since the separation of the Antilles from the mainland. If this distri-

bution began, roundly, a million years ago, then the rate of spreading need have been but a few yards per year on the average. Such a speculation may seem gratuitous, since we know neither distance, time, nor rate of possible progress; but to each of these factors can be assigned an outside limit, and the fact remains that these little underground diggers have come from somewhere, and must have had time to perform the journey.

In the broad sandy river were shoals of the curious four-eyed fish (*Anableps*), of which more anon. To ourselves the water appeared so warm, and was so laden with sand, that a bath was no refreshment, although we tried to imitate the natives by lying in the current in the evening for a tediously long time. It may have been the shady forest-life, which we had been leading until recently, that made the open savannah, the river, and the town so trying to us: the worst sensation being the burning heat which seemed to collect in one's skin; the feeling of hopelessness as to the drying of anything in the hot, moisture-laden atmosphere, and the incessant thirst, very imperfectly quenched by means of small bottles of beer or mineral waters, each of which cost half a peso. At an exchange-rate of twelve pesos to the pound sterling, this meant about 10d., but to the Mexicans it was nearly 2s. The "drink bill" threatened to rise to fabulous proportions, and the worst of it was that the stuff was warm, and that warm soda-water passes through the body as through a sieve. The only real and lasting relief proved to be boiled water, and plenty of it too, taken hot.

CHAPTER VII.

THE ISTHMUS OF TEHUANTEPEC.

By Rail across the Isthmus—Tehuantepec—The Women and their Dress—Life at an Inn—The Prefect.

It rained heavily during these August nights, in the early morning hours. The streets were then transformed into pools of mud, in which big toads wallowed and muttered; in the crowns of the dripping palms sat the black vultures, spreading their drenched wings in the rising sun to dry; but a few hours later all the water had vanished, the ground became caked, and the whole atmosphere was thick with moisture. On such a morning, still in the dark, and at the tail-end of the pouring hot rain, we picked our way to the station, fondly hoping to catch the 6 o'clock train, which plied on alternate days. But the train refused to budge for another hour-and-a-half, on account of that little business for which Locadio and his friends were wanted. However, we were in ample time at Juile, the junction, where the train from Coatzacoalcos was moderately late, and we experienced a new sensation, a ride on the Isthmus line, and there was every hope of making Tehuantepec by 5 or 6 o'clock in the afternoon.

The line passes through the densest swampy jungle, which rises on either side of the narrow road-bed like an impenetrable wall, composed of many kinds of herbs, creepers, broad-leaved plants and flowers, shrubs and trees. In the foreground were selaginella and ferns, and broad-leaved hot-house plants, picked out by the vividly orange mock flowers of the "platanillo." Then follow shrubs, wild rubber and fig-trees, and

palms, all densely packed, and held together by long festoons of creepers. All this has grown up within a few years, since this railway was built. In the background the primeval forest has remained untouched ; the stately limbs of noble trees are festooned with long, pendent grey-green masses of Spanish beard (*Tillandsia usneoides*), and these permanently moist forests seem to stretch, as a solid blue-green mass, even into the far horizon. They are enlivened by the large red macaw, which sails like a fiery cross of red and blue through the verdure ; or, tamed and educated, watches his mistress, a coffee-brown, much wilder and less intelligent beauty, who sings and smokes in her hammock under the banana-leaf covered hut, while her husband approaches with a pail to beg for some water from the engine. That is a little custom which may be seen all over the country, where water happens to be scarce or too muddy. The engine requires tolerably clean water, and plenty of it, and the natives know that a few bananas, mangoes, aguacates, or zapotes, not to mention a pineapple, will always open the tap. And where is to be found that gruffest of American drivers who, on the parched, interminable and dust-swept plains of the north, could resist the little ragged maiden who asks for " una copita de aguita," " a little cup of waterlet " ?

To see all this beauty in its tropical profusion is very pleasant ; to have to watch it from a crowded train is a very different matter. Heat, noise, dirt, and smell, not to use stronger terms, assail the senses on all sides. The ill-ventilated cars reserved for the natives, crowded to the utmost, resemble regular slave-dhows, and emit an intolerable stench. The first-class carriages are also crowded, mostly with whites, who smoke, spit and swelter with perspiration, deplorable-looking people, sallow and drawn, many of whom are hoping to recover from some tropical illness by making for the other side of the Isthmus, or are ordered to some spot where extra work awaits them, the man in charge " being down," although they themselves are equally close to the breaking-point. There is no cheerful talk, no story-telling, no humour, no quarrelling, or swearing, the general mental atmosphere is far too depressing for that. The doors at either end of the cars bang incessantly

as they swing to and fro with the jolting and bumping, and at every curve the wheels shriek with the grating against the rails. The collecting of the fares was done upon principles not very remunerative to the company. Every self-respecting white man avoided buying a ticket if he could possibly help it, and provided himself with a permit for the occasion. For the matter of that, we ourselves also had free passes, generously granted for a whole month up and down the line. The natives were treated differently. When they were *bonâ fide* passengers, say for a distance of six stations, the conductor gave them a ticket for half the distance, and he charged half-price for the balance, which he pocketed. In days of stricter supervision the trains became quite unpopular.

That Isthmus railway had cost enormous sums to the Mexican Government, which had fully determined upon the construction of such a line. During the fifteen years of its existence it had never been in working condition, even to a moderate extent, and if it had been, there would have been no traffic, since the harbour at Coatzacoalcos, on the Atlantic side, was next to useless, while on the Pacific side there was none at all. At last the Government came to an agreement with Sir Weetman Pearson, who had already finished the great drainage-system of the valley of Mexico and the harbour works at Vera Cruz, to put the whole concern into order, and to work it. This involved the construction of proper works at the port of Coatzacoalcos, and the making of a great harbour at Salina Cruz, while the crazy old line itself had to be rebuilt. When we saw it parts of the old permanent way had been condemned as hopeless, but were yet used, the new line being but partially ready. The difficulties were great indeed. The line goes through swamps and dense forests, always, on the Atlantic slope, soaked with moisture; moreover, it follows or crosses the valleys of streams which are liable to sudden floods, while the embankments are cut up by countless rivulets, which scoop out the sodden road-bed, while here and there long stretches of the red clay slopes slide down. There seems to be here every kind of subsoil, from bog and clay to porous rubble and hard rocks, limestone, sandstone, and granite.

We stuck fast in several places, where the rails had first to be cleared of the red clay which had been washed on to them during the previous night's rain. But there were also delays for other reasons, thus: the train came to a halt at a bridge where a pair of oxen had upset a goods train. This sounds improbable, but the careless people on it had run the train, with the engine at the rear end, into the oxen, which proceeded along the line until they fell upon the trestle bridge; the first car fell into the river, the others piled up, and the bridge was broken. It cost some trouble to convey the contents of our train to the other side through the scene of confusion, and then the whole crowd had to await, in this pretty wilderness, the chance of a relief train.

Towards sunset the ordinary east-bound train turned up, not knowing what awaited it. At the end of this train was a well-equipped private car, which I boarded, in spite of the remonstrances of a Chinaman, who had a little English and Spanish at his command. "Boss a-dam, dammee mucho mal!" He slammed the door in my face, but a dapper young man, a picture of health and of quiet, bustling energy, immediately mounted the platform, and, hearing that I wanted to speak to the boss, said: "I am in command here, if that is what you mean by the 'boss'; my name is Adam, and this is not a passenger car." By the luckiest of accidents we had thus fallen in with Mr. Adam, to whom I had a warm letter of introduction. With his introduction to my wife, and much shaking of hands, followed a complete change of scene. He, the commander-in-chief of the harbour works at Salina Cruz, had been expecting us for some time, though not exactly at this place, at which he was stopped through our accident on his way east. Henceforth we were under his powerful *ægis*, or, rather, we had the pleasure of enjoying the friendship, help, and advice of a most courteous and accomplished gentleman. How we revelled in the comparative luxury of a late tea, a clean dinner, with even some ice, prepared by the now beaming Chinaman! We had not had a bite, except fruit, since the early morning, and were without the prospect of any more.

It was a hot but lovely night. Near the divide of the Isthmus is a kind of open plateau, appearing almost barren by contrast with the dense vegetation of the Atlantic slope, and here, at Rincon, at a height of 800 feet, railway and other engineering works were being established, besides a kind of sanatorium. Unfortunately, in spite of the elevation and open situation, the general state of health here is, or was, not as good as might reasonably be expected, perhaps on account of the many pools on the plateau. Thence westwards the whole character of the landscape changed in marvellous fashion, the Pacific slope having a hot and dry climate.

We arrived at Tehuantepec at five in the morning instead of the previous evening, and awoke on the Pacific side of the world. From the way in which people talked about far-off Tehuantepec, we were prepared for a kind of miniature tropical Paris, and it may be that its well-sounding name enhanced its glamour. It is one of those names which stick in one's memory since early schooldays. Tehuántepé—from the Nahoa "tecuani," a wild beast—means "jaguar-hill"; but it is named from the white patches of quartz veins in the broken face of the porphyritic hill, in which fancy discerns the outline of a jaguar. This little hill, in the south-east of the town, commands a strikingly-beautiful view of the broad valley of the river, the cultivated fields and the woods rising in the north upon higher hills, which in their turn develop into jagged sierras. It affords, too, by far the best view of the scattered town itself, since all the slanting, red-tiled roofs show up well amongst the dark green groves of trees, banana plantations, bright green fields of sugar-cane and maize. The slope of this hill contains the oldest settlements in the place, the real native mud-walled huts and houses, rising in irregular tiers, with lanes which have never been planned or laid out, but which have been wearing themselves, crookedly and deep, into the rubble of the ground from time immemorial. On the top stands a little shrine of masonry; it holds no image, but at sunset a silent, forbidding man, issuing from the nearest house, climbs up to put a lighted lamp into the recess. Many such lights are kept burning in niches on the heights which overlook the

town from the other side of the river, and well-meaning people advise strangers not to venture too near these places, since they are dedicated to the native gods, and weird rites are practised there in the dead of night. Sometimes a crucifix surmounts such a niche, and some even hold a tawdry Madonna. These additional things cannot do any harm, and are intended to keep off a possibly over-zealous Catholic priest.

Seen from within, the scattered town looks more like a half-deserted village, and this is probably due to the violent earthquake which took place in 1901. Many of the houses, all of them low and one-storied, were left in ruins, and, instead of being cleared away, were left as they had fallen, while others, better-looking houses, were put up somewhere else. But most of the place looks as if it had been deserted fifty years ago, with open spaces, buried in deep sand, here a few scrubby trees, there an attempt towards forming a street, which is nowhere paved, but possesses a raised side-walk composed of slabs or boards along and in front of the houses. There is, however, a large square with a well-kept garden, surrounded by some municipal buildings and the principal shops; but even the well-to-do—and there are some rich people here—do not make a pretence at living in anything like moderately comfortable houses. The inhabitants seemed to have earthquake on the brain. Severe shakings are, of course, rare, but even during our short stay not a day passed without one or more slight "temblones," which, by us inexperienced people, were at first taken for a passing steam-roller. The popular belief is that a good rain overnight stops the chances of any serious convulsion, —at least, that is what they excitedly talked about in the mornings.

We went straight to early mass, and saw many things characteristic of the place. The body of a man, who had died of "some fever," was taken from his house to be hastily buried, the women in the house sending up a heartrending howl which soon changed into a regulated long-drawn wail, the howl being renewed whenever a new mourning friend appeared. At last the men trotted off with their burden, and there was an end to that particular scene. The church, an old Spanish building,

MACHETES AND KNIVES.

looked a most picturesque ruin ; it had a wide rent from top to bottom, and was so unsafe that it had been gutted and closed. They had constructed a roomy hall, in the form of a lean-to, and this was covered with corrugated iron, and supported by railway sleepers, iron pipes, and other bridge-building material belonging to the railway ; most of the old furniture had been put into the new building, and all was clean and neatly arranged, only it looked very much like a hastily-improvised stage at a fair, and this impression was enhanced by the behaviour of the orchestra, all players of wind instruments, who were a little late in coming. The priests were already officiating, and two men in the right farther corner were blowing for all they were worth, to make up for deficient parts. Now in came the trombone, crossed himself hastily, made a deep genuflexion, and in the very act of rising, joined in with a " prrump." Next came the piccolo-flute, who, without further ado, tootled himself up the aisle and joined the orchestra, which was thus rendered complete.

In the same building we assisted at a wedding, at which the bride was bedecked with green and gold. This was a good opportunity of seeing the famous " huipiles " of the Tehuanas. " Huipil " is the Nahoa name for an embroidered chemise, which is worn by most other tribes in the usual way, but these particular " huipiles " have undergone a peculiar transcendental development, having grown into a purely ornamental garment, and from continued one-sided use have lost their original capacity of being put over the body. The " huipilli " is, in fact, a short white chemise, to the neck and waist of which is attached an elaborate frill of lace about a foot or more in width. The sleeves, when there are any, are either sewn up, or are represented by ribbons. The whole thing is starched, and is worn in several ways. When walking in the street they wear it with the neck portion resting upon the shoulders, and the waist is turned up over the head, and serves as a sunshade. For going to church and similar festive occasions, the rim of the neck is fastened round the face and tied under the chin, so that the starched neck-frill stands out like a

gorgeous Elizabethan ruff, while the waist-frill rests upon and covers the shoulders, bosom, and bare arms down to the elbows; one sleeve hangs in front, the other droops over the shoulder. The whole affair only wants a pretty face to set it off, and beauty is indeed a striking feature of most of these Tehuanas, or "tiger-beauties," as we called them. Their usual dress consisted of a short-waisted blouse, low in the neck, without sleeves; the neck and armholes were edged or bordered with contrasted needlework, the principal colours being red or purple in various patterns. Secondly, they wore the "enagua," a skirt, likewise of cotton, either white or coloured. Over this was sometimes worn what might be termed a short overskirt. The Tehuana does not wear shoes, she even dances barefooted, and has no need to be ashamed of her deficiency in this respect. She is extraordinarily fond of enhancing her beauty by adorning her raven hair with bright, scented flowers, and by wearing jewellery, though she is liable to overdo the latter, since she converts her savings into rings, gold chains, filigree work, and gold watches, and it is not unusual to see four or more valuable watches dangling on long chains about the waist of a wealthy lady. We never tired of admiring these women, who are notoriously the most beautiful in the whole Republic; of course, not all of them are so, but the majority are very handsome, with a beautiful figure, excellently graceful carriage, and not at all undersized. Even their movements are likewise most graceful, this remark applying to the wealthy as well as to the servant class. "Tiger beauty" indeed was theirs; but it does not last, and they are liable to grow fat. But there is nowhere absolute perfection, always some drawback, and here it consists in the grating and utterly unmelodious voice of these friendly and lively women. Their complexion ranges from a dark coffee-brown to almost white, every degree of mixture of the aboriginal Indian and the European races being represented; what these natives were like at the time of the conquest we do not know, but they must have been attractive, and these attractions have borne fruit ever since. The selective principle has worked well, and the women are fully aware of their power. In fact, they are *the* power in the

whole district, which should consequently be a paradise for suffragettes. They do little menial work, mainly the fetching of water, the preparing of tortillas, and washing. Yet nearly the whole of the trade is in their hands; so much so, indeed, that all commercial transactions are done by them, or at least require their sanction.

At the market-place all the vendors are women, most of them sitting on low, peculiarly-shaped chairs, called "butacas," which are covered with the skin of a jaguar, or a cow, or with red-stained leather. The goods are brought and deposited by the men, who then withdraw. There are "huipiles" and other forms of clothing of many colours and patterns; heaps of fruit and flowers; turkeys, fowls, fish, and meat, and—a curious sight—rows of "tilcampos," or black iguanas, which are worth two fowls each, being much esteemed for their delicate flesh; the poor things are alive, but can neither bite nor scratch, since their legs are tied together with their own tendons, and they are similarly muzzled. Another corner is given up to pottery, notably the hard-baked black Juchitán ware, mostly large oval-shaped vessels; "jicaras," large and small cups, dishes and basins, made of gourds, gorgeously painted, and often inscribed with a name; cocoanuts with engraved patterns and perforated, used as coffee strainers, the same neatly-shaped utensil, with an additional handle, being also made of the firm black clay; quaintly carved pieces of wood, in an infinity of patterns, but always with two loose rings, are the universal implements employed for stirring and crushing the chocolate.

Of the chief local industries may be mentioned the weaving of cotton goods, the most prized being blouses and skirts composed of fibres which, before they are woven, have been dyed with the juice of the purple snail. Much Indian corn, cotton, and coffee is grown and exported, and the same applies to the sugar-cane, used for the production of "caña," or sugar-brandy. Above all, the town is the collecting centre of the trade that is carried across the Isthmus, both to Oaxaca and far into Central America.

The population of the town and immediate neighbourhood

PAINTED "JICARAS," OR GOURDS, AND BASKETS FROM TEHUANTEPEC.

Gourds with Carved Designs, and perforated for straining Coffee.

amounts to more than 10,000, almost all of these being Zapoteca, many of whom still speak only their native idiom. The place is moderately healthy, much better than the Atlantic side. During our visit it was troubled by yellow fever, but the cases, although all fatal, were sporadic, though, of course, more numerous than was officially admitted. The doctor's wife had just died, and the doctor, on this account, felt somewhat under a cloud, the difficulty being aggravated by the fact that he was a foreigner. A few people died suddenly overnight, and were hastily buried, and it was given out that they had come from somewhere else. Things looked a little alarming when a troop of actors arrived from Guatemala, and took lodgings in the opposition inn, where there happened to be a genuine case of yellow fever. This caused an exodus, and the histrionic company took shelter in our inn, where one of the "stars" wept over this particular "yellow peril," though another was much more afraid of the "sanguesugas," or vampires. Both were a nuisance, swinging all day long in the hammocks of the little "patio," and jabbering, singing, and bewailing their ill-luck.

There are two inns in the town, both managed by Basques, one called Tocaven, the other named Bustillo. The latter was married to a Spanish-Mexican woman, and yet his younger sons looked typical half-blood Indians. But that is just what happens in these countries. Being run by a Basque, the inn was very orderly, though otherwise most moderate in style; the charge per person for "asistencia"—*i.e.*, board and lodging—was two pesos per day, but Tehuantepec is a dear place for the little which it has to offer. However, drinks were plentiful and of great variety, from soda to firewater, stuff that could rival the juice of the tarantula, so that it was doubtful which might be less dangerous. Of the soda-water we could never get more than two bottles at a time, the reason being that only four bottles were in existence. This explained the extraordinary proposal which came from another man, to set up a "fabrica de aguas gazeosas y minerales," if assisted with the capital of five pesos necessary to purchase the plant. When we found that the water would be taken from the river, we felt

MODERN POTTERY.—II.

Top Row: Red Clay, inlaid Ware, from Cuernavaca. Second Row: Red and Black Clay Ware, from Oaxaca. Third Row: Guadalajara Ware, Zapoteca Ware, Pulque Jugs. Bottom Row: Porous, unglazed Jug, the rest partially glazed, green and white, from Zapotlan.

sorry. The water supply was bad, there being no springs, not even wells. Every day at sunrise and after sunset the women trooped to the river, where they scraped holes in the sand to get a mere puddleful of "filtered" water, whilst they themselves chatted and bathed in the river. Then each in turn took a drink, lifted the heavy porous jar on to her head, and walked off, in stately fashion, squirting out a large mouthful of water as she went—a trying, but universal habit of the country.

Tehuantepec, being such an important centre of commerce, has many vice-consulates, in the charge of some trader as usual. Not only in Mexico, but elsewhere, the German consular official gives his travelling countrymen all the information and help he requires, and no less surely will remark: "I know of a place where we can spend an evening together, where there is 'echt Pilsener,' and where we shall find 'landsleute.'"

The English official, provided the credentials come from the right quarters—and the less official they are the better—is less profuse with information, but invites you to dinner, where men likely to be useful will be met.

The Prefect of Tehuantepec, Sr. Demetrio Santibañez, was an exceptionally vigorous man, and proved of the greatest help to ourselves. Tall, strongly built, fearless as a lion, he ruled the district with firmness and tact, not an easy matter with a population whose leading characteristics, according to him, are "independence and laziness." He was always full of "go," and did everything himself. First he had to settle a complicated conjugal quarrel, cross-question witnesses, and smilingly threaten the husband with imprisonment unless he modified his attitude; then he sent for the young woman to be confronted with her spouse, threatened to lock them up together, argued, admonished, made them kiss his hand, and sent them off rejoicing. "Any fine?" "No, my little ones, but if you don't keep your promise I shall catch your husband and make a soldier of him." Then he whisked round, signed some papers, snatched another from a too leisurely clerk, and rattled off a type-written copy with his own hands. "I am so busy; will you wait, or come back after an hour? No, better have a look round the garden, and I will send my orderly

with you." I shall always regret having omitted to photograph that tatterdemalion orderly in sandals, with his revolver, "machete," rod of office, short, wide cotton trousers, disgraceful military tunic, and black-ribboned straw hat. Demetrio was himself fond of animals. In his own large and clean house he had a little menagerie, consisting of parrots, doves, a "pavo"—*i.e.*, some kind of penelope, or curassow—a monkey, and a young deer. One of the most remarkable creatures, according to him, was a lizard, transparent, brittle as glass, and dreadfully poisonous; it was a gecko! Deer were brought in every morning in numbers, and the skins could be got for fifty centavos; but the hunters could not be persuaded to bring the heads, since these are invariably cut off and buried, by way of propitiating the spirits, the lips having first been sprinkled with water. The skin of the jaguar is valued at from three to four pesos only.

Sr. Demetrio, having cleared the district of not a few dangerous characters, and being honest, had many enemies, and slept in a well-barricaded room, guarded by some devoted henchmen. The greatest power in the town was a certain old woman, who ruled the place by means of her shrewdness and wealth, and through moneylending had got many of the people into her hands. Every important transaction required her sanction, lest it should go awry. Illustrious strangers were supposed to call on her. It was no secret that she and the Prefect did not pull together, and that she used her best influence to prevent his approaching reappointment.

A month later President Diaz granted me an audience, to report about our trip, and soon got on the subject of Tehuantepec, where, I could truthfully tell him, I had received much exceptionally vigorous help from the Prefect. "Oh, Santibañez, he is the right man for them." What the President does not know about his own country is not worth knowing. It so happens that this man of iron will has kept a soft spot in his heart for Tehuantepec, ever since, many years ago, he was military commandant at that place, and that, too, during most unruly times. There is still told the story of a revolt which he quelled by clapping the women into prison; next

morning there was a dearth of tortillas, and there was nobody to prepare them, and this broke the resistance of the disaffected citizens. However, even Sr. Demetrio's powers were limited. He could not force unwilling and lazy, but free, Zapoteca to keep an engagement. We wanted to spend a few days at the coast lagoons among the Huavi tribe, whose chief village, San Mateo del Mar, is scarcely more than twenty miles from the town. It was enough for the owners of the necessary animals to see the orderly making enquiries to delight in showing their independence. We were determined not to spend another night with that company at the inn, and at last engaged a peasant with his ox-cart, Demetrio, the orderly, Mateo and myself having worried, interviewed, and pleaded till noon, and again at 3 p.m. after the noonday siesta, as the " carriage " was to be ready at 5 p.m. Then we waited and waited, rushed about once more, lost what was left of our temper, and formed a sad and exhausted trio. It is these petty worries and delays, and the chafing feeling of helplessness, which are more exhausting than anything else. A whole day was gone, and most of the previous afternoon, and it had been crazily hot, about 95° F., in the coolest shade, without a breath of wind. Then, at 8 p.m., the two-wheeled ox-cart came to the back-door, and half-an-hour later we were off.

HIEROGLYPH—TEHUANTEPEC.
Tecuani-tepec = Jaguar Hill.

CHAPTER VIII.

A VISIT TO THE HUAVI TRIBE.

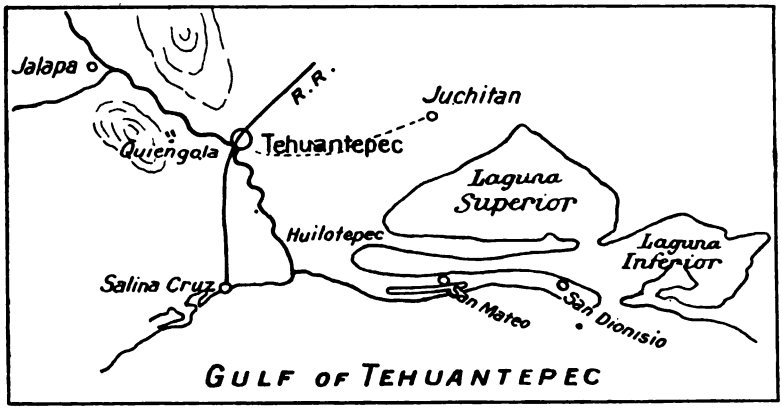
Travelling by Ox-cart—San Mateo del Mar—The Huavi—Education—The Lagoons—Tortoises and Iguanas—First sight of the Pacific—Characteristics of the People and their Houses—The return Journey—An ancient Hieroglyphic Map at Huilotepec—A Turtle Dinner.

The owner of our ox-cart, a Zapotec, knew only a few words of Spanish, and we knew nothing of his idiom. He had half-filled the cart with leaves of Indian corn as provender, and this made a good bed for my wife between the baggage. Slowly we crawled out of the town, and then struggled and bumped over the slabs of rock in the utter darkness until the plain was reached. Progress with oxen is slow anyhow, and these were particularly deliberate ; one of them, a brown beast, was called " Tilcampo "—the iguana ; the other's name was " Necre " ; Mateo thought that this was meant for " negro "—black—as the creature was of that colour, but the owner thought otherwise. Early in the morning we made Huilotepec, not yet half-way, and prepared a little tea by the riverside. By sunrise the oxen were exhausted, not so much by the amount of the load or the distance traversed, as by the fact that they were not " a yoke," Necre being only about half the size of Tilcampo, who towered above him.

The surroundings were pretty enough, the road passing most of the way through low jungle ; dew was dripping from the leaves, and a king vulture sat in a tree, so near that I could have touched him with the ox-goad ; then he woke up, shook himself, and began preening his feathers.

"'Cozcaquautli,' neck-lace eagle, my forefathers called this bird," said Mateo, who was a Mejicano. A solitary tree-frog was sitting near by, and a green and yellow spotted snake (*Drymobius margaritiferus*) was climbing a tree on the other side.

Soon the oxen refused to go another step, and the village was not yet in sight across the seemingly endless plain. After much talk and gesticulation, the Zapotec was induced to take a message to the village asking for a relay of oxen, whilst we cooked breakfast and waited. Hours later the Zapotec returned with a good yoke of oxen and also a native, a Huave,



THE ISTHMUS AND BAY OF TEHUANTEPEC.

who did not speak either Spanish or Zapotec, and soon ran back to make his report to his authorities, whilst our "Pullman," as Mateo called the ox-cart, followed steadily.

The oxen are either driven by the man who sits on the pole and talks to them incessantly, or they are led—that means to say, they follow a person who walks a yard in front of them and sets the pace. For a while I was entrusted with this office, while the rest of the company tried to sleep perched up on the cart. All went well for a time, but then there was a commotion, followed by shouting in three languages, as the oxen charged a boulder, upsetting the cart into a roadside pool. The passengers made uncomplimentary remarks quite beside the point, as it

was really the fault of some tiny toads which had tempted me to turn aside to a puddle to catch them, whither the oxen had followed me! A single specimen was secured, which in London was recognised as a new species of *Cystignathidæ*, and immortalized as *Eupemphix gadowi*.

The whole country is quite flat, the plain was scarcely a dozen feet above the sea, the soil a sandy grit mixed with pebbles, while here and there were pools but a few inches deep, which, in some cases, had dried up, leaving behind a white saline

TRAVELLING BY OX-CART.

crust. The well-grown trees of Tehuantepec are replaced by trees of lower growth, standing separately, spreading out their branches, umbrella-fashion, intolerant of epiphytes. The thorny mimosas, with their carmine blooms, had disappeared with the drier ground. In more swampy places were cocoanut palms and many fan palms, also good-sized organ cactuses and opuntias, and that although this ground is periodically inundated. One of the most peculiar trees was some kind of *Crescentia*, or "jicaro"-tree, the cauliflorous fruits of which, shaped like gourds and flasks, are used as "jicaras," or vessels.

Some of the deeper and permanent pools are surrounded with thick jungle, rushes, and reeds, inhabited by many birds, such as various kinds of heron and bittern, wood-ibises, rosy spoonbills, snake-birds, tree-ducks, stilts, and sandpipers. On the open ground were long-billed curlews and stone-curlews, looking as large as ostriches when standing on the little hillocks, the latter rendered invisible, and the birds themselves enormously magnified by the mirage.

San Mateo del Mar, a distance of only twenty miles, was reached about noon, after a journey of sixteen hours. The

MARKET PLACE OF SAN MATEO DEL MAR.

head of the district, with the other local officials and the schoolmaster, were awaiting us. "Stop! Who are you to commandeer a yoke of oxen? Have you any papers?" When the schoolmaster had read and interpreted the Prefect's emphatic letter of recommendation, their manner, dignified and firm, though still somewhat suspicious, changed at once, and they bade us a hearty welcome. We were lodged in the "curato," where, with our camp bedsteads, we did pretty well, though there were fleas in abundance! The party was too exhausted to do much that day but swing in the hammocks of the priest, who was away, and explain to the authorities the object of the visit.

San Mateo del Mar, or Huazontlán, is the most important of the four villages of the Huavi,* who inhabit the flat lagoon district south of Tehuantepec, close to the Pacific shores. The whole tribe now counts not more than 3,500 souls. At the time of the Spanish conquest they seem to have had vague traditions that they came from the south; a recent study of their language by that accomplished linguist and philologist, Don Francisco Belmar, has shown that they belong to the great Maya family. They are quite isolated from any tribes who might be their possible relations, being hemmed in from the west and north by the Zapoteca, to the east by the Xoconochco, and to the south by the ocean, which they do not navigate. The name "Huavi," by which they are known, has been given them by the Zapoteca, and means "rotten," obviously a term of contempt. Their principal occupation is the catching of fish and crustaceans, which abound in the lagoons. They keep cattle, but do not kill them for food. They have one industry, which is probably quite peculiar to them, namely, the weaving of small pieces of cotton cloth, "huatz"—hence the Aztec name of "San Mateo"—which they dye with the juice of the *Purpura patula*, a marine shell which is common on the rocks. Brasseur de Bourbourg† gives an account which has found its way into both German and Spanish books: "When the women, half up to their knees in the water, find such a mollusc, they take the shell gently off the rock between two fingers, and squeeze the violet juice upon their cotton, and then carefully replace the creature in order not to destroy it." Fancy a big, limpet-like shell allowing itself to be lifted gently from its rock! Moreover, the juice squeezed out from the animal is colourless, or of a milky white, and turns purple only after hours of exposure to the air. The reader who is interested in this matter will find a fuller account in Chapter XXI.

The original religious customs of the Huavi have been much suppressed by the missionaries, who established themselves early amongst these peaceful people; moreover, they were to

* The paper by Nicolas Leon, "Los Huavi—Antonio Alzate," XVI. (1901), pp. 103–129, contains a map and a bibliography.

† "Revue Orientale et Américaine," Vol. V., Paris, 1861.

a certain extent civilized by the neighbouring Zapotecs. On the occasion of several official raids, which were made not long ago upon their sacred places, a few terra-cotta idols were found and carried away to the museums of Oaxaca and Mexico. These were human figures in a sitting, cross-legged posture, with large ornamental mitres, though it is uncertain whether these finds were of genuine Huavi make, or had been imported from the Zapotec. Such raids of this kind, and the consequent punishments—idolatry being forbidden—have made these retired people very suspicious of sudden visits, and they are extremely reticent. We did not gain admission to the church, although we tried our best, and the promise to open it two or three days later, when the priest would be there, had no attractions, since by that time all the interesting little pagan outfit would have been safely removed. The Huavi still venerate crocodiles as their spiritual brothers and sisters, the soul of every crocodile being deemed to be intimately connected with that of some person who will die if the reptile dies. It must have been a rude shock to them when, a few years ago, a gang of American skin-hunters slew nearly all the crocodiles. The people still feel bitter about it, but, being a peaceful tribe, they left the "Gringos" alone; moreover, their hands were tied, since, as they were nominally good Christians, they could not very well put forward their plea of Saurian affinity. Had they been Zapoteca, every one of the white hunters would have met with an "accident."

We became quite fond of the Huavi. Most of the interpreting was done by the schoolmaster, who, as is usual amongst the less civilized tribes, was a Zapotec, thanks to the extraordinary mental capacity of this people. His business was to teach the children Spanish, the instruction being given both in this language and in the vernacular. The elementary schools being free, entirely supported by the Government, and education being compulsory, there was no great hardship in that. The head men, of course, spoke Spanish. Let us for a moment consider the mental standing of such a schoolmaster. He must know, and speak fluently, two languages—in the present case he spoke three, his native Zapotec, Spanish, and Huavi.

He had obtained his education at Oaxaca. Such a tribe gradually becomes bi-lingual, and may remain so for many generations; if they are intelligent, enter into commerce, and possess towns, the vernacular gradually fades away, and Spanish reigns supreme. Such bi-lingual people and tribes are called

THE ZAPOTEC SCHOOLMASTER AND THE PRESIDENTE MUNICIPAL.

"Ladinos," a Spanish term, which, for obvious reasons, has come to mean clever, canny, cute. They are fully aware of the advantages of Spanish as *the* surest way of communication, in a country where, as for instance on the Isthmus, in Oaxaca, and Guerrero, very different tribes are inextricably mixed. Their respective languages are sometimes so fundamentally different that, for instance, the Zapotec, with his quasi-

monosyllabic idiom, finds it as easy to learn the universal Spanish as the polysynthetic Aztec, of which, after all, he would only learn one of the many dialects. Sometimes this Spanish is very interesting on account of its hybrid nature. Not the mere mixture of words, that means nothing, except that it enriches the language, but the natives will still think in their old vernacular, even although they may no longer speak it. In Southern Guerrero, where Nahoa was the latest, although not the original, native idiom, and where now Spanish is spoken, a man will sometimes express the idea of "in my house" by "mi casa dentro," instead of "en mi casa," still clinging to the Aztec syntax of "no-cal-co"—"my-house-in."

On the morning after our arrival we found a full-grown marine turtle lying on her back in front of the door. It was a present from the village, and they had deposited the heavy creature without making the slightest noise, in order to surprise us. The Presidente then invited us to a trip over the lagoons. The village lies on a narrow strip of lowland between the sea and the lagoons, which communicate with the sea. They are divided into the lower or outer lagoon, called "Diuk guialiat," and the larger upper or inner lagoon, "Diuk guialoni." The narrow channel between them is named "Tiak-mash-mual," *i.e.*, "hill passes canoe," meaning where the canoe passes between hills. The shores are mostly sandy, covered with poor vegetation. The bottom of the lagoons is quite hard, and a great portion of the inner estuary is shallow—at least, I could walk into it for hundreds of yards. During the winter, or dry season, much of the inner lagoon is said to become dry; in its eastern half are about a dozen little islands, or rather rocks, covered with scrub. The people had a flat-bottomed canoe ready, a dug-out, large enough for a dozen people; but they never use sails nor oars, only long poles for punting. A fresh breeze made the water rather choppy; and to prevent the canoe from getting swamped they put up pieces of plaited palm-matting on the weather side.

Far from the shore some men were fishing, standing up to the waist in the water, and quite naked, but with the head

covered by a sombrero, around which were wound the clothes. These men, burnt a deep black-brown through the glare and heat, were fishing with "atarrayas," conical, rather shallow and round nets, the circular rims of which were "leaded" with those little perforated terra-cotta discs, so common in ethnological collections. The fisherman holds the net by the centre, swings it round, and then lets it go, when it spreads flat over the water, and is hauled back by a rope attached to the centre. The lagoons seem to be teeming with fish, shrimps, and larger sorts of crustaceans, so that the Huavi need not go for fish to the ocean, the terrific surf of which their clumsy canoes could not possibly withstand.

We landed on a narrow spit, and found quite a little reptilian fauna: the small and the large sharply striated *Cnemidophorus* lizards, *C. deppei*, and *C. immutabilis*; these were being preyed upon by a snake (*Zamenis mentovarius*), in the successful chase of which everybody joined, with the merry and excited Presidente at their head, and the snake in turn found its enemy in the shape of the omnivorous black iguana (*Ctenosura acanthinurus*), which, in default of finding sufficiently large trees at hand, burrows in the ground. Whilst one of these iguanas was being unearthed, there tumbled out of the loose sand a specimen of the rather rare *Geagras redimita*, a little burrowing snake, with tiny eyes, and of a whitish-yellow colour, like the sand in which it lives. A box-tortoise was also amongst the spoils. At some places the shore, instead of being sand and pebbles, was one mass of heaped-up shells.

These dunes are inhabited by a hare, which the four specimens that we brought home proved to be *Lepus calotis*, var. *flavigularis*, a rather large hare, with most conspicuous white hind-quarters. Various visitors have mentioned them as rabbits, in conformity with the account of the earliest Spanish chroniclers, who dilated upon the abundance of these "conejos," or "conies." It is the only place where we met with this easily-recognisable species.

The return to the house brought us an agreeable surprise. The Zapotec master had given his school a holiday, in order

to take them out on a tortoise hunt in the neighbourhood, and he had kraaled the spoils under the verandah, to the amusement of the adult population. There were no less than forty-seven specimens! Thirteen *Chrysemys grayi*, and six *C. ornata*, which Mateo at once christened " chatas "—snub-noses; three *Nicoria rubida*, of which we had already found one in the shrubs (this being a terrestrial kind), and twenty-five box-tortoises (*Cinosternum cruentatum*), a decidedly Central American species, which here seems to find its northern limit. Of course, there was great rejoicing, and our kind helpers were invited into the "curato" to partake of some refreshment. Here the Presidente, a man of delightful manners, showed his tact and dignity. He took a cup, bowed, and made a little speech; the boatmen were soon dismissed as likely to incommode us, and it was only on repeated pressure that he allowed a few others to come in, calling out each man's title by way of introduction. First, " Sr. Syndico "—*i.e.*, the chairman of the annually elected village council—and so forth. Later, he was invited to tea, which was a new beverage to him, and whilst he was sitting there his eyes fastened on our folding canvas bath, which had been recently filled. Perhaps his stare was too much for the rickety thing; somehow it gave way and flooded the floor. The man's face became a study, he was internally convulsed with laughter, and yet he tried to suppress it until he took a hasty leave.

The night was not very restful. As the tortoises could not well be left outside, we put them in the neighbouring empty room of the "curato," to keep Mateo company. All night long those forty-seven hard-shelled creatures bumped about, tumbled over each other, piled themselves up in one corner and then tried the other, always with the same unsatisfactory result. The day-time provided other diversions. The roof of the house was inhabited by black iguanas, which are not eaten by the Huavi, and which therefore provided ample opportunity for studying their habits. In the morning they came out of their crevices to bask in the sun, their patchy grey and dark-brown colour changing meanwhile to black. Then they climbed into the mango trees to eat leaves, and lie

in wait for insects, especially for the shrilling "cicadas." Now and then one climbed down the stem, head downwards, with its tail flexed in a curve, and on reaching the ground tore up a mouthful of grass, which it chewed deliberately. At first they were not shy, and could be caught with a stick and noose, which they allowed us to slip over their heads. Like all other lizards, they paid little attention to the noose, keeping their eyes fixed upon the person. When caught they became very wild, biting, scratching, and dealing painful blows with their strong tails. Some which got loose in the house became a terror to the inmates, running in their senseless fright even up one's body, in order to try and jump on to the beams overhead—and the twenty claws of a large iguana are as strong, sharp and curved as those of a tiger-cat!

Mateo and I went to the sea one afternoon when the heat, reflected from the sand and water, was less trying. Between the village and the ocean is a long but narrow lagoon of brackish water without an outlet, both sides being covered with scrub and low forest. In the middle of the lagoon we saw something bobbing up and down, and stalked it, crawling on our bellies with the utmost care, only to find that it was our own turtle, which the people had moored to a stake there. Having had to strip, to swim the lagoon, and not knowing what more water there might be, we left our clothes and proceeded without them. I myself dressed in a pair of short bathing trousers, which had often to be ready for emergencies, so that we soon found our costume to be quite in keeping with that of the men who lived there, away from the village. These men walked about quite naked, with only a "tapa-rabo" or narrow strip of cotton passed through the fork, and tied to a plaited loin-string. All these men and boys, who rarely wear clothes, are much darker than those who dress, and all the females were much lighter in colour. Further, where the loin-string presses upon the skin the latter invariably becomes of a bluish tint, owing to the black pigment which the irritation causes to be deposited in the brown ground-colour. The wood was mainly inhabited by large brown pigeons, but also, curiously enough, by the "road-runner" (*Geococcyx affinis*), which uttered a loud

but low note sounding like "Bō." Iguanas also had made burrows, the sand being heaped up between the roots as around a rabbit-warren. Our first sight of the Pacific was somewhat disappointing; a flat, rockless shore, upon which broke long and mighty rollers, although the sea was as calm as a mill-pond, the rollers being of a dirty yellow-brown colour. Rashly I went in for a bathe, but was not prepared for the tremendous surf, which threw me and rolled me about like a log, whilst Mateo danced about in helpless excitement. On the shore were several dogs, which were said to have permanently strayed away from the village, and to subsist entirely upon the shore-crabs, which they hunted in pairs, and then devoured on the dry land. There was not a single shell, nor any driftwood, along all this desolate coast, only pebbles and brown mud.

The village is not less interesting than the people. The church, a remnant of an old Spanish mission, was kept in good condition, but, as mentioned before, we could not gain admittance. On account of earthquakes the bell-tower is a low shed in front of the church, with some ancient bells, and a couple of gigantic stationary drums made of hollow trunks, which are used not only for church festivals, but, when played in a certain way, for summoning the men officially.

The dwelling-houses are very different from those in other parts of Mexico. To a certain extent they remind one of the houses of the Huasteca, north of the State of Vera Cruz, and those of the Maya, at least to judge from photographs. The principal feature is the very high pitch of the roof, which is thatched with the short leaves of the fan palms; the walls are sometimes wattle-and-daub, sometimes thatched like the roof. The eaves are narrow. The interior consists of one room, at one end of which are the sleeping mats. On one side stands a kind of altar, adorned with the usual tawdry pictures of saints, but also with other, much more interesting, things, which the owners will on no account allow to be approached. From the beams are suspended the few household goods; the fireplace is not raised, but is on the ground. From one of the houses, one of the few which we were allowed to enter, we carried off a

pair of old iron stirrups, of the same quaint design as was used by the old " conquistadores." Another feature of these settlements is that the houses of the well-to-do stand in a kind of enclosure, fenced in by flimsy but high stockades of reeds, with a movable shutter for the gate. Within the enclosed ground, which has an agreeable, tidy appearance, stand a few nice trees, a palm, or a ceiba-tree, and mangoes. Detached from the house is a kind of verandah, well thatched, beneath which are slung the hammocks.

The flowing garments and the beauty of the Tehuanas are

STOCKADED ENTRANCE.

here unknown. Most of the women, but none of the men, are slightly tattoed, or rather, marked by a pair of small but deep scars beneath the high cheekbones; the mouth is large and rather prominent, and the nose is flat, while the hair is tied in a sort of top-knot; consequently they are not exactly beautiful. The men make a very different impression: although of medium or short stature, they are well built; the nose is aquiline, with a narrow bridge, much bent towards the tip, and is larger than in any other of the Mexican tribes, even larger and more prominent than that of the Zapoteca. The black and straight hair is cut short; the beard grows very late,

and is, in the pure race, restricted to the chin. A few of the old men have grey hair, but none of them white.

The men were always busy with a distaff, spinning thread, or else making nets, which they slung round their waists whilst walking about and talking. Their favourite assembly-place was an enormous, wide-spreading tree. On our round of visits, the Alcalde, or judge, was, of course, not forgotten; the fact that he had hitherto not shown himself was explained by his fondness for drink, and he was rather a surly old boy.

PRESIDENT AND HIS FAMILY, SAN MATEO.

We were quite sorry to leave this village after a sojourn of four days. Food had been plentiful; with fruit, the eggs of fowls and turtles—the latter rather too oily—and fish, nobody fared badly, but it was a question of drinking-water which compelled us to move. All the water around is got from clean wells, which are scratched a few inches or a foot deep into the hard sand, but unfortunately it is brackish, and although this taste could be concealed, the salt remained, and when drunk in quantities it amounted to more than was desirable. Moreover, our Mateo was not well.

The return journey promised to be quick, yet it took thirteen hours, but was full of interest. The Zapotec, with his Tilcampo and Necre, was dispatched with the baggage, whilst we followed in the afternoon in a Huavi cart, with the tortoises, iguanas, and the big turtle slung at the back of the cart, we having offered to take the turtle as a present from the village to the Prefect at Tehuantepec. In one of the pools still stood the very same horses, well above their bellies in the

THE ALCALDE AND HIS FAMILY, SAN MATEO.

water, and feeding upon the reeds, that had been there four days ago. Our driver, unfortunately, spoke only his native idiom. In the forest, when in complete darkness, he stopped, unyoked the oxen, and uttered from time to time a long-drawn yell. Then there appeared out of the wood, as stealthily as a jaguar, a tall, absolutely naked man, who, together with the driver, began pulling the things out of the cart. This we resented furiously, and much tri-lingual talk was bandied to and fro, but without any effect, and the situation became unpleasant,

until a third man appeared with a new cart and pair. It had all been pre-arranged by the Presidente, but unfortunately he had only mentioned it to Mateo, who was far ahead.

At half-past ten in the night we united at Huilotepec, a Zapoteca village, and found all the officials with some torches waiting in their " town hall " to show us their famous " mapa lienzo," or kerchief map. They would not have done this without a special order from our friend the Prefect. At first sight it looked, in the badly-lighted room, like a dirty cotton towel, but these maps, of which only a few are still in existence (another is said to be at Juchitan), are most interesting documents. The people look upon them as a kind of charter of their municipalities, given to them by the early Spaniards. In the map various dyes were used to represent the course of the river from Tehuantepec to the sea ; the sandy bed of the stream being in yellow, and the rocks in black. The town, and the villages, were indicated by their hieroglyphs in Aztec, as, for instance, Huilotepec (dove-hill), which was a green hill with a blue bird on the top having its wings uplifted. There were also figures of people, squatting in rows, with their names written against each, both in Spanish and in ancient Zapotec, the writing being in Spanish characters. These are supposed to be the dignitaries of the places, the witnesses of the transaction. After we had admired this map long enough, they brought out a clean copy, an exact replica of the original, on a new piece of cloth. They were all most polite, but sedate and quiet. The Zapotecs did not care for the Huavi, would not even allow them into the house, and Mateo, the Mejicano, hated the Zapotecs, who cross-questioned him about many things, until he turned sulky. Yet, they would not allow us to depart until midnight, and there was nothing to eat or drink except the brackish water we had brought from San Mateo. By this time we were deadly tired, and tried to snatch what sleep we could in the cart, which went slower and slower, with frequent halts, as our driver slept soundly on his perch. Therefore he was made to walk, and I took his place, vigorously prodding the pair of fine bulls which, in the hot, close night, reeked abominably. The sun rose with more

than the usual glorious tints, when we crawled into Tehuantepec, dead beat, but the richer by several unforgetable experiences.

Demetrio was pleased with the turtle, and arranged for a feast to take place at our inn, on account of its superior culinary facilities. He invited a friend or two, and we did the honours, so that the positions of host and guests were slightly mixed, and there were turtle soup, turtle steak, turtle eggs, and turtle something else at noon, at night, and the next day. Then we felt we had done our share, and yearned to recruit "at the seaside," amongst the luxuries of Salina Cruz, only thirteen miles by rail. Most hospitably received at the large and clean company's house, which stood on rising ground, overlooking the sea, we found it a veritable haven of rest, in spite of the incessant traffic of trains, and the heat, which ranged from 77° F. at sunrise, to 95° F. in the shade. Although the room-temperature averaged from 88° to 90° F. until bed-time, it was mitigated by a strong breeze, either from the north or from the south, whilst at Tehuantepec there was scarcely a breath of wind.

HIEROGLYPH—HUILOTEPEC.
"DOVE-HILL."

CHAPTER IX.

SALINA CRUZ AND JIGGERS.

Salina Cruz and the Harbour Works—The Jigger, or Sand-flea—Bird and Reptile Life at the Coast.

Until a few years ago Salina Cruz was justly feared as a deadly hole, where nearly every white man died within a year. The "old town," a wretched conglomeration of native huts, of palm-trees and reeds, stood on a narrow neck of low-land between the sea and an evil-smelling lagoon, surrounded by thick brushwood—a fever-haunted place. Mr. Adam's first action was to clear away all this scrub, and, unfortunately, the few date-palms as well; but he is a man of thoroughness. "It is better to be yearning for the sight of palms than dying in their shade from fever," is an apt rendering of the German saying, "Man wandelt nicht ungestraft unter Palmen." This clearing has had a great and most salubrious effect. All the offices and the houses for the white staff have been erected on the higher ground, and an entirely new town has been regularly laid out, and everywhere were rising pleasant, airy, slate-covered buildings. Another trouble was the water supply, the only available brook, and that intermittent, passing by the cemetery, which contained by far the largest number of white men in the district. All this has been changed, and an inexhaustible supply of water is now carried to Salina Cruz from above Tehuantepec, which town is also benefited thereby, thanks to General Diaz.

The great harbour works were only commencing, and the future docks and quays were to be laid out on the site of the old

village. They were busy with the construction of a great breakwater, at the temporary head of which stood a Titan crane. It was an ill-fated giant. Once when employed on the Vera Cruz breakwater it toppled into the sea, but was fished out again; then it was conveyed across the Isthmus, and is now buried in deep water in the Pacific, beyond all chance of resurrection. This came about in the following way. Only a few days after our visit there was a submarine earthquake. A great tidal wave came in at noon, followed by others at a few hours' interval respectively, until in the evening the last wave, an enormous one, swept over the land, doing fearful damage, the whole of the old village being submerged and swept clean away. These same waves also caused great loss of life and property at the Huavi villages. We did not hear of the disaster at Salina Cruz, however, until we reached Oaxaca; the previous accounts by the natives of some great disaster that had happened were all so garbled that nothing could be made of them. Even at Oaxaca it was difficult to make out what had actually taken place, comical misunderstandings having exaggerated the accounts in the newspapers. A Mexican engineer was most impressed by the reported loss of 7,000 "durmientes," which had been carried out to sea. "What are 'durmientes'?" asked an American. "Sleepers," said I. "Oh, I say, this is real awful," he went on, "fancy 7,000 of these poor devils thus being drowned overnight." The solution of the puzzle was that what we call sleepers (railway sleepers, of course), the Americans know as "ties," and, curiously enough, the Spanish term "durmientes," is an exact translation of "sleepers."

Mr. Adam's staff consisted of about a dozen English engineers, who took a delight in the chance of talking about Old England, and about something besides railways, harbours, and accounts. One of these was a Cambridge man. The life of such men is a hard one in these out-of-the-way places, full of temptations, requiring great moral and physical strength. With work, hard work, all day long, in an unhealthy climate, incessantly worried by unwilling and careless natives, whose languages to them are as sealed books, they come in dazed

and tired to their meals, and turn in dead beat, to swelter with perspiration throughout the night. The abstemious man alone has a chance of keeping his health, and he is not happy, as he is liable to be considered a muff, which is, after all, but to be expected. He who cannot control his ever-present thirst is the first to fall a victim, and there are several diseases ready to carry him off. They reckoned that if out of a dozen but three should die within two years, it would be a fair average not to be complained of, and this is what actually did take place, amongst the victims being the University man. Spaniards have a saying that in tropical countries the three S's should be avoided—"Sol, sereno, sayo," or "sun, chilly night, and petticoat"; the Latin races, being characteristically abstemious, do not add the fourth S—spirits—which is, perhaps, the greatest danger to the northerners.

The country round is thinly inhabited, and the difficulties in getting a large number of willing workers together was enormous; this trouble alone seemed sufficient to drive any manager to despair. It was interesting to watch on the Saturday night the hundreds of "navvies," representatives of more than half-a-dozen tribes, crowding round the pay-office. Nearly all of them were natives of the hot countries, since those of the plateau, who are much better and steadier workers, are liable to die like flies on account of the climate. There were a number of negroes from the West Indies, amongst others some Martinicans, who had been dislodged by the earthquake. Being bound by a contract they had to work for lower wages, and thus caused discontent among the brown, free natives; indeed, it became advisable to house them separately in some white-washed tin sheds surrounded by palisades. For the sake of peace and safety, a detachment of soldiery had been applied for and sent from Juchitan, and the first request of the officer in charge was to have strong blockhouses built, as the only means of preventing his soldiers from running away and marauding in the neighbourhood. To cap all, a detachment of rural police was summoned to look after the military.

One can imagine the trouble of breaking in wild natives

to the use of the white man's tools and implements; for instance, to prevent them from taking the wheels off the barrows and using the barrows as stretchers, or from carrying these strange things on their backs. The wiry native can trot for hours and hours with a heavy stag slung at his back by a loop round his forehead, and he will load himself to staggering point, but the first day's pushing or wheeling will reduce him to utter misery. And if he is spoken to harshly, or laughed at, he gathers up his few things and is seen no more. A few Chinese had established themselves as cooks, store-keepers, and washers. They had made themselves nets, and were the only people who fished in the sea, a thing which the natives of the place had never done themselves.

Amongst all this turmoil of blasting, ballast trains, making and laying of concrete blocks, shifting, digging, forging, and quarrying, interspersed with accidents and illness, Mr. Adam moved as commander-in-chief, praised by all the white men for his business capacities. Quiet, sparing of words, or silent almost to provocation, he was everywhere, saw everything, praised nothing, never swore, but ruled with the proverbial iron hand in a velvet glove. Frugal and abstemious, and the picture of health, he expected everybody to do and be likewise. The evenings spent at the charming house of our kind and delightful host are an agreeable reminiscence.

The days were spent in prowling about. Seeing on the first morning some boys disporting themselves on the beach in the shallow water, I ran across half naked to join them in a swim, This, however, I did to my sorrow, their brown skins being sun-proof, whilst mine became so badly burnt, each drop of water acting as a lens, that for weeks after I suffered acutely.

THE JIGGER.

To avoid wet boots whilst wading about the lagoons and on the shore, I frequently went barefooted like the natives, although warned not to do so. One of the results was my personal acquaintance with the jigger, or sand-flea, two of which were discovered in my toes. Several others were, unintentionally, allowed to ripen until we arrived at Oaxaca; during

our second journey they attacked me at the Balsas, and again near the coast. The experience thus gained was, although moderately unpleasant, certainly more interesting than hearsay, and forcibly drew my attention to this pest. This execrable beast is a flea, called "nigua" by the natives; in English it is called "jigger," a modification of the South American "chique," or "chego"; scientifically it parades as *Dermatophilus*, *Sarcopsylla*, *Sarcophaga*, or *Rhynchoprion penetrans*. Both sexes are of the size of a flea, of a pale whitish yellow, and affect sandy places, where they hop about in the dust and dirt, sucking blood like other fleas, and leading a roving life.* But the impregnated female becomes sedentary for the rest of her life, fixing upon and digging into the skin of its victim, whether dog, pig, cat, or man. Other kinds prefer bats, and at Aguafria squirrels were badly infested with them. Concerning man, the favourite spots are the toes, mostly near or under the nail. The creature digs itself in and gets underneath the skin, remaining with its hinder end just beneath the surface. At first nothing much happens beyond a slight inflammation and itching, and a feeling of fulness at the spot; but on the fifth day the female has swollen to the size of a large hemp-seed, and increases to that of a small pea. Lying, as it does, beneath or within the skin, this is raised, and the whole thing looks much larger than it really is, especially when embedded in the soft skin of small mammals. This swelling of the female is mainly due to the development of her eggs, numbering perhaps a hundred, which cause the abdomen to become a globular bag. If left undisturbed, one egg after another assumes comparatively large dimensions, growing to the size and shape of that of a louse, and the ripe egg is squeezed out into the dust, where it turns into a maggot-like larva. These are plentiful in the huts, the floors of which are often made of a mixture of clay and cows' dung, an ideal feeding-ground for the cultivation of the larva, which ultimately transforms into a flea. Presumably, after some weeks, when the last egg has been expelled, the spent female dies, and is cast out by the

* The first good account is by Karsten, "Bull. Soc. Imp., Moscow," 1864, Pl. 2. See also "Zoolog.-Anzeiger," 1884, p. 673.

skin in the process of renovating, unless—and here comes the danger—the wound has become inflamed by rubbing, and infected by dirt and other insects; or, if, worse still, the whole bag has been injured or burst. Where one flea settles, the inflamed region appears to attract others, and thus it comes to pass that the feet of some unfortunates present a shocking and deplorable sight, being completely honeycombed with the nests of this pest; thus they become cripples for the rest of their own lives, and all the while spreading the pest among others. Careless and dirty habits are the chief cause. The vast majority of the people do not suffer much. They advise you to leave the creature alone for the first day or two, lest she dig herself in deeper and break off. But when it is once well established and swelling, a nimble-fingered woman will carefully enlarge the hole with a needle or thorn, and, if all goes well, lift the whole of the yellow bag out. So far so good, but then the operator rubs into the wound a mixture of saliva, tobacco-juice, and ashes, by way of well-meant disinfection. My own personal trouble with sand-fleas caused quite a ridiculous alarm amongst the white community. Mateo, however, dug the creatures out, and a drop of carbolic acid, put into the hole with a paint-brush, settled the case for good, without any further annoyance. The same treatment was equally effective on later occasions, although we always managed to break the egg-bag. It is customary, when the feet are examined at the camp-fire, to hold the extracted bag in the flame, where it bursts with a little crackling explosion. At least, the clean Zapotecs consider it heinously bad manners not to burn the eggs, and thus to avoid spreading the plague. By the time Oaxaca was reached, two of the jiggers were already in full laying condition, and each of them, when operated upon, jerked out a full-sized egg.

The sand-flea is a native of tropical America. The Spaniards soon found this out, and so did the Portuguese in Brazil. Their slave-ships introduced it to the west coast of Africa, where it was well established by the middle of the last century. There, upon the feet of the native carriers, it followed the ancient trade routes inland, and within the last few decades it has crossed the whole continent to the east coast, and has got

even into Madagascar. British East African jiggers are not allowed to leave the country, for fear of introduction into India, where officially they are still unknown, but, unfortunately, there is nothing to prevent them from entering that country by way of Goa, which is a Portuguese possession.

* * * * *

All along the coast there are both large and small lagoons, some in communication with the sea and clean, others consisting of rain-water, full of evil-smelling mud and scrubby vegetation, inhabited by blue or white herons, large and small bitterns, curlews, stilts, and sandpipers. "Quebranta hueso," or fish-hawks, usually perched upon the branches of some fallen tree, "zopilotes" hopped about, and *Quiscalus* chattered in the reeds. Pelicans and cormorants skimmed along the breakers, and the graceful *Tachypetes*, or frigate-bird, floated aloft, though there were no gulls, terns, or ducks. All the birds were so unsuspicious, that they might have been knocked over with a stone; they knew that nobody would take the trouble of molesting them.

The reptiles on the sandy parts were a revelation, so far as their colour-patterns were concerned; every kind, both lizards and snakes alike, were sharply marked with longitudinal stripes, whilst the crossbars and spots, so exclusively prevalent on the Atlantic side, were absent. There were the little swifts, *Cnemidophorus deppei*, with a greatly increased number of white stripes, and otherwise golden green above and dark blue below, running like a flash over the hot sand, and so hot themselves as to be quite disagreeable to the touch. The large *C. immutabilis*, most difficult to catch, since it makes for the roots between the shrubs, has fewer stripes in a state of incipient dissolution; *Conophis vittata*, a snake, which is milky-white or yellowish, with a few dark brown or black longitudinal stripes, crawled about the rocks or in the houses, and the irascible *Zamenis pulcherrimus* was also common, the forepart of its body dark brown with milky stripes, this pattern changing quite imperceptibly, a little further back, into the exact opposite, so that its long tail is of a milky yellow, with conspicuous dark stripes. One of these snakes was a monster

of its kind, more than eight feet in length. Another, only five feet long, showed remarkable intelligence. At first he made for a large patch of ground covered with spiny tussocks, in the midst of which stood some low, tangled trees. Four times he attempted to break through in different directions, but was always headed off. We had almost given him up after a long search, when he was rediscovered climbing into a tree, where he stretched himself flat upon a branch, only, as often happens with reptiles, he forgot to hide his tail. Then he showed fight, and was secured.

It was rightly remarked upon by those engineers here, who kept their eyes open for such things, that most of the snakes responded well to the coloration of the trees. Yet they are not really professional tree-snakes, but spend much of their time on the ground, and only occasionally ascend trees. These are mostly shrub-like, have no dense foliage, and the bark of their branches is generally quite smooth and of a pale brown. The smooth surface reflects the sunlight, so that such a branch frequently appears dark from below, whitish along the sides, and light brown on the top; a *Zamenis* stretched along such a branch is in perfect harmony with its immediate environment. No more need be said, except that the snake probably knows what it is about.

The lizards which inhabited the shrubs further inland, were climbers, mostly arboreal, and frequenting, like the geckos, the rough-barked trees, while *Sceloporus* here was covered with rough scales, dark-coloured, and mottled. There were also iguanas (*Ctenosaura*), the young and half-grown specimens of which were of a vivid green, and spent their time in hunting for insects in the green crowns of the shrubs. Not all of them, however, fitted their surroundings. On the big house lived a half-grown specimen, away from any vegetation; its favourite place of observation was at the corner of the red-painted balcony, where its beautiful green was a most conspicuous object. But yet it knew what it was about. It lodged in a hole between the boards at the other end of the house, and reached this hole, when disturbed, by running along and beneath a suitable ledge, being thus all the while out of sight.

After various attempts to catch it at its post, it became very wary, and ran away in the manner described, whilst at first it was satisfied with slipping round the corner.

A little further inland the hills are covered with low growth of scrub character, while it is only dense here and there in the valleys. This scrub really consists of trees, but these, grow low and squat, spread widely, branch early, and each tries to make as much as possible of its own shade. They are mostly leguminous plants, as, for instance, *Jacquinia*, with its delicate pinnate leaves, acacias, and mimosas; also a tree called "rabo de lagarto," or "lizard tail," from its bark being raised into low, thick conical points; and some kind of *Parmentieria*, with a smooth brown stem freely furnished with long spikes. This abundance of spikes shows the prevalence of xerophilous vegetation. Climbers, epiphytes, and underwood are not tolerated by these umbrella-like trees, they themselves forming their own substitute for underwood; indeed, only a tufted, grass-like, epiphytic tillandsia is common. On still drier places are many kinds of cactus, large and small, and a few opuntias.

Another feature of this xerophilous flora is that the stems and branches of many shrubs either have a light brown bark, which peels like tissue paper, or a pale grey-green rind, containing chlorophyll, to enable the plants to live when the leaves are withered through drought. The ground is mostly sandy, with large and small boulders of light reddish porphyry cropping up, and on this ground lives *Phrynosoma asio*, the largest and most beautiful of "horned toads," coloured in soft tones of red and yellow, with blacks and browns exactly resembling the soil, and at the same time able to change its colours rapidly when well baked in the sun. Geckos and the tree *Sceloporus* make their abode on trees that have rough and darker bark. But among those creatures that live on the ground, red and yellow hues prevail; as in the case, for instance, with *Sphaerodactylus glaucus*, a gecko, which, in its younger stage, has the head and thick little tail coloured orange; while others have an orange-yellow throat and a pair of blue patches on the lower neck.

The beds of the rivulets were dry, with here and there offensively-smelling puddles, tenanted by large and small water-beetles, while baby frogs and toads were swarming in the neighbourhood; the adults, among them the common *Rana halecina*, and several kinds of *Leptodactylus*, were sitting in holes between the roots of the trees, wherever any moisture trickled out. *Bufo marmoreus*, by the way, was the only

THE PACIFIC COAST WEST OF SALINA CRUZ.

amphibian which inhabited the dirty puddles in the old village.

We also made an excursion westwards, to find out whether it was possible to follow the coast to Puerto Angel, and thence to strike due north to Oaxaca. No information about that side of the country was available, and the maps showing the lagoons are of no use whatever. Fortunately, we only spent one day there, to learn that some of the lagoons were connected with the sea, whilst at their shoreward ends they lost themselves in scrub and swamp. A track is said to go further inland, parallel with the coast, but there is none leading thence

to the north. To the west of Salina Cruz is a fine promontory, with a lighthouse, and the ridge further inland commands a fine view of the coast, showing what it is really like; lagoon following lagoon, with dunes, scrub, and swamps, or abrupt red promontories jutting out into the ocean.

This corner of the State of Oaxaca, round the Bay of Tehuantepec, is known to be rather dry, and the change of the aspect of the country east and west of the isthmus is striking. Whilst the rainfall at Coatzacoalcos amounts to about eight feet, at Salina Cruz a yearly return of only two feet has been registered. The State of Chiapas, again, is one of the rainiest of the whole country. One night we witnessed one of the grandest displays of sheet lightning which, reflected from the sea, showed up against the Sierra Madre, the coast range of Chiapas, at a distance of, perhaps, sixty miles across the gulf. A thick black bank of cloud stood at the far-distant horizon, almost incessantly lit up, though much too far off for us to hear any thunder.

The rainy season of 1902 was a failure in this district. The rains had begun with great violence in June, but had then stopped, and even in the month of September only a few occasional showers were falling, which made no impression upon the dry, overheated ground. This irregular drought had serious effects, and the general look of the country began to resemble that which was said to be typical of the so-called winter, or dry season. There was a scarcity of Indian corn, the stalks and cobs being miserably small, and ripening too early; many deciduous trees lost their scarcely-developed leaves, and began to bloom in accordance with their winter habit. The river at Tehuantepec had been falling steadily, and its sandbanks increased from day to day, while only now and then came down a little freshet, due to some moderate storm in the higher sierras. It was, therefore, rather surprising that our friends at Salina considered it impossible to travel to Oaxaca "right in the middle of the rainy season," on the assumption that the rivers and many brooks would be impassible. At best we might have to be prepared to camp on the wrong side of a torrent until the water subsided, though

if this were the case the journey might take many weeks. Two days were spent in packing and despatching a box containing our collections to be shipped from Coatzacoalcos, whence a steamer was to sail at a time which would be just convenient. As a matter of fact, the box did not catch that steamer, nor the next, and when it arrived at home it was found to contain nine inches of black, wet mud, which had caused many of the contents to rot—no doubt that box had been left for weeks standing in the open, to let the mud soak in, which could not otherwise have entered. However, the conveying of the box to the station at Tehuantepec, only a few hundred yards from our inn, cost a day's worry. Of half-a-dozen ox-carts standing there empty, which had been waiting at the station ever since sunrise for a train which did not come, not one could be induced to earn a peso by ten minutes' work. Loafers, who thought nothing of handling big loads, declared it was too heavy; "Why not take it empty and repack it at the station?" And when at last it was got there, Mateo had to sit on the top of it for three hours before it was officially received, and even then some ass of an official, who wanted "palm-oil" did his best to refuse it, until he was appeased, and had his scruples relieved as to whether the box might contain explosives, vanilla beans, or silver in bullion.

CHAPTER X.

A RIDE FROM TEHUANTEPEC TO OAXACA.
(FROM TEHUANTEPEC TO SAN CARLOS.)

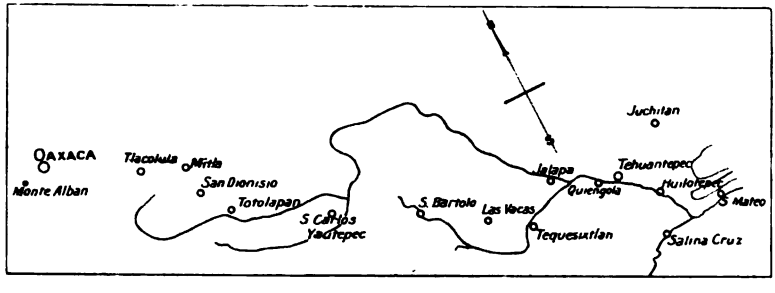
The Ruins of Quiengola—A new Drink—Plentiful Bird-life—Termites—Tequesixtlan and the Chontal Tribe—Collecting—Rattlesnakes and the Evolution of the Rattle—The Four-eyed Fish—Weaver-birds' Nests—Humming Birds—An eventful Day—San Bartólo and its jovial Schoolmaster—The unfathomable Indian Mind—San Carlos Yautepec.

Friend Demetrio rose to the occasion, and procured good horses, an ox-cart for the baggage, and a guard, and at sunrise we said good-bye to Tehuantepec, the Prefect himself accompanying us for some hours, and presenting us at parting with the skin of an unusually large otter. Having forded the river, which was a simple matter, our party divided, owing to some misunderstood, although well intended, order of the Prefect, and whilst Mateo with the ox-cart and driver followed an easier road, we with the guard wanted to see something of the ruins of Quiengola.

Within full view of the town, to the eastwards, is an isolated, flat-topped mountain, perhaps 2,000 feet high, covered with pines, and as they extend down a few hundred feet from the top, this "kopje" is about the southernmost and lowest point in the tropics where pines flourish! The top is said to be a fortified camp, the best account of which was that which General Diaz himself gave me, when he heard that we had not ascended to it. He had examined it many years ago, and it was a delight to hear this old soldier describe its strategic value to the old Zapoteca king, who had there been besieged by the Aztec emperor, not many years before the Spanish conquest.

After describing the ramparts, he told us how heaps of selected stones, "la municion"—*i.e.*, ammunition—were still lying at certain places, ready to be hurled down upon the assailants. Many ruins of stone buildings, palaces, courts, and temples, and a watch-tower with bastions, still exist about a quarter of the way up, overlooking the extremely steep south-eastern side of the hill, above the river. A somewhat inspired sketch and restoration of the place has been designed and published by A. Estrada.*

On the way to Jálapa the river had to be forded four times, though only on one occasion was it necessary to be careful.



SKETCH MAP OF ROUTE FROM TEHUANTEPEC TO OAXACA.

The people at this large village, being all Zapoteca, were at first rather reluctant in their welcome, but installed us in their town hall. The afternoon was so frantically hot that we spent most of the time trying to get cool in the river, waiting for the baggage to come up. However, it did not come, and we had to prepare for the night. Slowly the authorities became more amenable, and even ordered a much-needed dinner. As this took them many hours, I asked for a little hot water for tea, but it did not come until, rather late in the night, after the dinner, four men staggered in, carrying in a net a huge earthenware cauldron full of chocolate-coloured hot water. They meant well, and apologised for having been so long about it. They had requisitioned the largest vessel in the village,

* "Las Ruinas del Cerro de Quiengola. Memorias de la Sociedad Científica 'Antonio Alzate,'" Vol. VI., 1892, pp. 155-156, Pl. III.

and it had been difficult to bring it to the boiling point. However, we took a bath in that teapot.

Some of the natives were as good-looking as those of Tehuantepec, and we made friends with a family, whose daughter, about seventeen years old, was the most perfectly-proportioned and handsome girl we had ever seen. The parents were peasants, and passionately fond of her, but, unfortunately, she was beginning to suffer from lung trouble; she kept some little parrakeets as pets. These quiet, courteous people invited us to breakfast. Between their house and ours man showed himself at his worst. An ox was being butchered, and the meat, cut in long strips, was hung in festoons between the trees to dry, part of it being intended for our dinner. All this while another ox, tied to a tree, was forced to look on, making frantic efforts to get away from the blood-reeking spot.

Pimentel, the guard, although a teetotaller, introduced me to a new drink, "tepache," which is made of the juice of crushed or scraped pineapples, kept in a covered earthenware vessel until it has fermented. In spite of the sugar, it contains very little alcohol—only one or two per cent.—and it would have been pleasanter if the reddish-yellow stuff had been cool, and the old jar, out of which it was ladled with a cup of cocoa-nut-shell, not so dirty. After a walk round the village, Pimentel suddenly inquired, "Mi patron, y como se siente su estomagito?" "How does your little stomach feel, my patron?" gently patting mine the while. "All right." "I wish mine did," said the man of the broken pledge. This guard had caused considerable consternation amongst our friends at Tehuantepec, when they heard that he was to take charge of us. He had the reputation of being a profligate desperado, who had committed nobody knew how many murders, and yet he had been chosen by the Prefect actually to guard his person, and had been now, as a special mark of courtesy, handed over to us. Well, the man did look a ruffian, although he was the best-dressed man in the town, and seemed to know a thing or two. He was vain and boastful to a degree, but was also full of resource, and most solicitous

about our welfare, so that I was sorry when we had to part with him.

On the following forenoon we were the guests of an uncle of the Prefect, a retired colonel, who lived at his hacienda

OUR PROTECTOR.

half-way to Tequesixtlan. The lunch was characteristic. Two of his boys were sent up into palms to procure some green nuts, the "milk" to be stiffened with a little "aguardiente." Next came a pineapple, then beef garnished with fiery red-pepper pods, and eggs in various disguises fried in oil. Then, instead of a siesta, followed a ride in the noonday heat, in the

company of our courteous host, to Tequesixtlan, where, to our mutual relief, Mateo was found waiting with the baggage. The whole ride from Jálapa was through very pretty country, following a depression between the low coast range and the next series of higher hills. The moisture in the ground,

THE "CRESTED BEAUTY" (*Calocitta formosa*).

oozing out from the foot-hills, ensured a permanently exuberant vegetation, and there was an abundance of bird-life. Long-tailed little parrakeets whirled about in swarms, and the short-tailed, yellow-headed "loros," climbed about in pairs; while little inca doves and brown pigeons, grackles and *Cassicus*, hawks and weaver-birds, cormorants, white herons, black "zopilotes," and red-faced "auras" were also to be seen. The

pretty long-tailed and delicately-tinted white and blue jays (*Calocitta formosissima*), were great favourites, and watched us with curiosity from an overhanging branch, with their feathery topknot well curved forwards, and were so confiding that they whistled back when whistled to. Caracaras (*Polyborus cheriway*), large birds of prey, prettily dressed in black-brown with yellow facings, the underside striped with dark and pale cross-bars, were another sight that never failed to give us amusement. They went about in pairs, and stopped still in the middle of the path, allowing us to approach within a few yards. Then they walked aside, and turning round to stare at us, put their heads well back, and uttered their shouts, of which the Spanish name "caracara" is not a bad rendering; otherwise they are known by their Aztec name of "huiche," or "guiche."

But if there is one sound more than another which conjures up to the full the delights and troubles of the Mexican tropics, of the really hot low-lands, it is that of the ubiquitous little doves, whose cooing sounds as hot as is the shade in which they sit, making love to each other. Their affectionate behaviour is really touching to behold. They spend most of their time on the ground in search of seeds, always in pairs. Then one flies on to a branch, to be followed within a few seconds by its mate, and then they kiss. They also are marvellously free from shyness. I have shot, with a pocket-pistol, within a few yards of a nest; but it was only at the second shot that the bird flew off, and within a few minutes she was sitting again whilst I stood by, the nest being built in a low and open mimosa bush.

TERMITES.

Here we saw in the trees, for the first time in perfection, the huge nests of termites, or white ants, conspicuous and quaint-looking objects, that sometimes look like bee-hives stuck into the fork of a tree. They stand at a variable distance from the ground, but always upon the big branches, and form black-brown masses, irregular, but more or less globular in shape, sometimes measuring a yard in diameter, with a rough exterior, and containing innumerable cavities, in which the

termites live and breed. The whole mass is entirely built up from the excrements of the creatures, which is ultimately composed of comminuted wood, and similar vegetable matter, cemented together by the secretion of their saliva. The whole thing is quite hard, and is always added to from the exterior. At its base several tunnels, made of the same hard, brown material, lead down to the stem of the tree into the ground, whence they may apparently be continued in any direction, whether to other trees without nests, or else far away to some dead timber. We found the tree-nests most frequent in the hot-lands of Southern Oaxaca, and again in the Balsas basin.

There are various other kinds of "white ants," most of which have their colonies underground, and it is no exaggeration to say that, in many districts of this hot and warm region, there is scarcely a tree which is not visited by these little creatures, a little tunnel of cemented earth or woody fibre leading up the stem and then further along the branches. Unless the traveller breaks open one of these small tunnels—and one is sure do so inadvertently by simply leaning against a tree, or grasping one of the branches—he will not see any of these small blind white creatures, which look like degenerated ants. Since they never work in the open or expose themselves to daylight, but always build tunnels before them wherever they go, they are blind, and of a yellowish-white in colour. When they come to a suitable piece of wood they eat it up, and thus convey it away, always, however, carefully leaving the exterior intact, so that the log, box, piece of furniture, or anything that takes their fancy, is completely hollowed out, and collapses when touched, and yet appears to be perfect. Some termites take a fancy to the framed pictures hung up and left undisturbed in churches. These become queer-looking objects; the inside of the glass, to enable the little creature to work in the dark, is pasted over with an opaque layer of cemented earth or wood, and the picture itself is gradually eaten up, together with the frame, the mere ghost of which, with the glass, is left firmly glued on to the wall.

Many a time, when I have surveyed their tunnels on the trees, it has much puzzled me to understand the principle which guides

the termites in the positions they choose for the scene of their operations. The wetting of the rain does not hurt the tunnels—at least, they do not collapse, although the walls often become soft and brittle. Sometimes they are so placed on the underside of a sloping branch that the water is bound to run along them ; or they cross over to the upper side, or continue to run in a right or left direction in seemingly erratic fashion. At last a sudden storm brought the desired solution—at least, a working hypothesis which seemed to stand the test : the tunnels are so placed that the tree and its branches are on the " weather " side of them, the storms in this country coming almost invariably from the same direction. Thus it comes to pass that the covered ways of these termites, although quite exposed and often in the run of the drip-water, are safeguarded against the actual beating of the drops. An exceptional storm does, of course, play havoc with these tunnels, and the termites are always mending their roads.

Although they are usually called white ants, they have no relationship with the great fraternity of wasps, bees, and ants, though in their social arrangements they wonderfully resemble them. They have a queen who is the veritable and sole mother of the state, with princes, one of whom becomes consort. Only their royalty have two pairs of neuropterous wings, and with these they are allowed but a single flight, whereupon each princess selects a consort to found a new state, their wings drop off, and the pair never see daylight again, each queen growing to a preposterous size, immured in a large cell. Truly said Sancho Panza, " The ant has wings to her sorrow," since the flight is the opportunity of birds and lizards, who devour most of the wedding party. The bulk of the race, which in the case of termites is of both sexes, is from the cradle onward turned into sexless workers and soldiers by some process of feeding and treatment which is kept as a secret of state. The soldiers, easily distinguished by their large jaws, are able to bite, but so do the workers, and both seem to have some poison in their salivary glands. At any rate, they can become a terrible nuisance, since, apart from their bite and their poison, the skin is already irritable enough from other horrors for one

to wish to dispense with their tickling. I but once mustered courage to pry into a big tree-nest. On the whole we were wonderfully free from molestation by termites ; the real terrors being the ubiquitous ants ; of these the smallest kinds were the worst, leaving red, burning streaks upon the skin ; indeed, some of these little terrors seemed to be herding *aphides* upon the tall herbage, whence they conveniently got on to one's neck. The soldiers of some ants are of a preposterous size. One, who might have been, to judge from his size and that of his weapons, at least a captain in the guards, inspected my toes, and then, without any provocation on my part, walked over the foot until he came to the tender part of the skin above the ankle, where he deliberately bit me, and then, turning round, injected his genuine formic acid and jumped off. The spot soon became blue and swollen, and hurt horribly. Occasionally a native, sent up into a tree after some cluster of lovely orchids, will give a sudden yell, and come down like lightning, that cluster being tenanted, perhaps garrisoned, by tiny, semi-transparent ants.

* * * *

Tequesixtlan is a large village, consisting of more than 1,000 inhabitants, who belong to the Chontal tribe, hemmed in between Zapoteca and Mixteca, and number in all about 10,000 people. Their affinities with other tribes are unknown, and their language, which most of them still speak, does not afford a clue. According to Belmar it has much in common with Nahoa, but, on the other hand, it seems to point to the great Zapoteca group of languages, and to our experienced ears sounded rather like Mazateca, which belongs to that same linguistic family. Chontal is the name given them by the Aztecs, in whose language Chontal is said to mean " strangers, outsiders," just the opposite of what " Nahoa " is supposed to mean. The majority seem to be tall, with long and almost straight nose, and with a thin beard on the chin and a moustache. The women wear the hair in two long plaits. The skin is mostly dark brown.

The village stands on rising ground, and has a very large square ; most of the houses are built of sun-dried bricks, are

whitewashed, and roofed with tiles ; those away from the plaza are more frequently thatched. At one end stands the "Ayuntamiento," or municipal building, at the other the "curato," and the school. As the "curato" happened to be empty and situated on the outskirts of the village, we took possession of it, or rather, of its broad and well-tiled verandah,

BELL TOWER, TEQUESIXTLAN.

which commanded a wild and pretty view. There is also a large and well-built church of a peculiar design, which was kept in excellent order. The bells are hung in a separate shed. The people are entirely agricultural, cultivating maize and beans ; they keep but a limited number of cattle, just enough for ploughing and carting, but have no special industry.

We applied to the authorities for a man to keep watch over our things upon the open verandah during our frequent

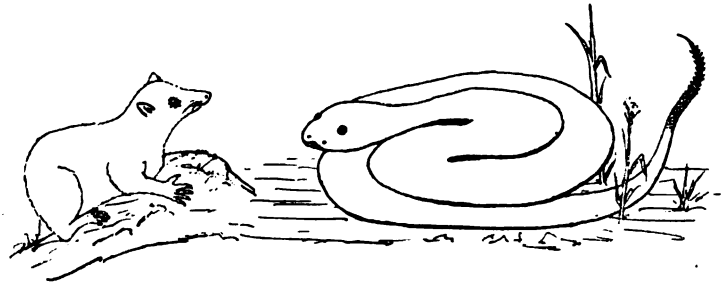
absences; the request was willingly conceded, but caused some astonishment. When it was bluntly explained that we did not want to lose any of our possessions, the answer was that there were no thieves amongst them. "How is that? Why not?" "Porque no es costumbre!"—"Because it is not the custom!" And this is one of the admirable traits of the unspoiled natives of Southern Mexico; they do not steal, and neither in any of the villages, nor when encamped near them, have we lost a single article, at least, not in the whole State of Oaxaca.

The schoolmaster, a Zapotec, who was an energetic fellow, declared a public holiday, and sent the boys out to search for creatures, the height of their joyful excitement being reached when he, with some thirty boys, accompanied us to the lovely river to fish. Mateo had still a few cartridges left, and let them off in the deeper pools; then the boys formed a cordon lower down, and thus retrieved most of the stunned fishes as they were carried down by the current. Next they arranged a sort of *battue*, driving the fish on to a sandbank or into a bay, where they dived for them. They did get some, and occasionally came up with a fish in their mouths, pretending to have caught them thus.

This district, from Salina Cruz to Tequesixtlan, was the only place where we found *Ctenosaura quinquecarinata*, a sand-coloured iguanid, only a foot in length, and with a tail beset with short spikes set in whorls. These creatures bear a strong resemblance to the Indian *Uromastix*, and behave much in the same manner. They do not climb, live on a mixed diet of insects, leaves and flowers, are very gentle and easily tamed. When ensconced in its lair, this lizard defends itself by side-strokes of its tail. Rattlesnakes, in the open places, attained to a considerable size; for instance, one specimen measured 120 cm., or 47 inches, an unusual length for *Crotalus terrificus*. This creature had a miserable rattle, composed of only three joints, but the tail was so curiously marked with half-a-dozen black bars, that these of themselves almost suggested a rattle. Of course this was a coincidence, and this race of snakes is liable to have such a black-marked tail, but the matter was

striking enough for Mateo to remark, "Faltan los cascabeles pero tiene formula"—"the rattle is wanting, but it has the diagram thereof!"

A full-grown, shrill-sounding rattle, composed of a dozen bells, is one of the most perfect instruments of warning, and looks like an instance of elaborate design, yet its evolution can be traced to insignificant, very different, beginnings, without any mystery about them. Not a few animals use the tip of their tail for attracting the attention of their prey, or of their enemies, towards that extremity—*i.e.*, away from the head. The same principle underlies many dodges practised by man,

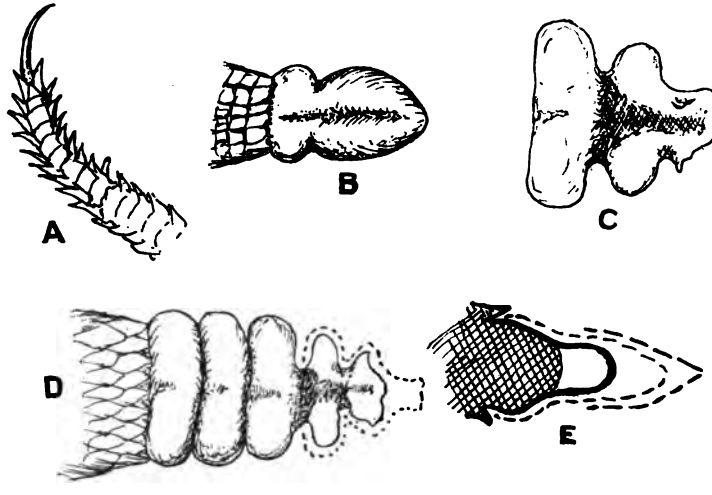


THE USE OF A VIBRATING TAIL.
Death-adder fixing the attention of its prey.

in fencing, in setting up a dummy, or in the fluttering, brightly coloured pennant of the lancer, which is not put upon his lance for the sake of ornament, but because it is sure to fix the attention of the assailed, while the deadly spike is reaching a foot further, and is being driven home. Some geckos, when cornered, wriggle their tail-end in a curious fashion, glad, if pounced upon, to escape with the loss of that member, which will grow again in due time.

In some snakes the tail-end is thin and tapering, and hence unusually mobile; moreover, this part is often coloured differently from the thicker portion of the tail, the chance of its being seen when held up and vibrated to and fro being thus increased. For instance, the arboreal pit-viper of India is grass-green, but has the end of the tail of a bright red. The

next stage shows peculiar structural modifications, as in the Australian death-adder (*Acanthophis antarctica*), the last inch of the tail being laterally compressed and very slender, beset with a few rows of enlarged, imbricated scales, and terminating in a thin, horny, thorn-like spike. The apparatus is reddish in colour, and looks not unlike a wisp of flowering



EVOLUTION OF THE RATTLE.

A. End of tail of an Australian Death-adder. (*Acanthopis antarctica.*)
B. End of tail of a young Rattlesnake (side view).
C. A complete link or joint of an adult rattle (side view).
D. Tail of an adult Rattlesnake with a rattle of three links (side view). The fourth joint, broken off, is indicated by dotted lines; although loose, it is held in position by two constrictions which grasp two corresponding swellings of the third "bell."
E. Diagram showing how the youngest "bell" is pushed into the next oldest.

grass, most likely to attract the attention of small animals, when the snake, already coiled up, slightly raises and vibrates the tip of his tail. Then comes another stage—a new departure—of a feature already foreshadowed in its earliest beginnings, by the frequent occurrence of a short, thorn-like tip, the thorn being, of course, made out of the thickened epiderm. Normally, this horny spike should be shed at every moult, together with the rest of the skin, and its place should be taken

by a precisely similar spike-shaped cap, which has grown up from beneath and within it. But if that cap should be stronger and more knobbly than usual, there is a chance that it may not slough off so easily, but stick on for a time, even though it may be ultimately pushed off by the newly-grown cap. But if this process should be prolonged and extended over a period of several moults, there would be left a series of dry, hollow, horny caps, which could not help rattling. This would be an accidental and unpremeditated result, which natural selection might then pass judgment upon and improve.

In Mexico itself we have all the above theoretical stages represented by some pit-viper or other. As the first stage there is nothing remarkable about the tail of the water-viper. Next we have the dreaded *Lachesis*, or "fer de lance," with a tapering, wriggly tail; in some this is coloured iron-grey to black, such a snake being called "palanca," which, in Spanish, means "crowbar," practically the same as the French term; or the tail is yellow, and looks like a piece of sharpened bone, these specimens being known as "rabos de hueso," or "bone-tails." On the higher mountains lives the small *Crotalus triseriatus*, which, for a long period during its younger stages, has an incipient rattle. Lastly, there are the various kinds of "viboras con cascabeles," with perfect rattles.

A modification, once well started, is liable to over-development, as in the case of tusked teeth, claws, horns, and antlers, some of which have quite outgrown their usefulness. In the case of these snakes, the rattles break off, mostly somewhere in the middle of the series of bells, but sometimes near the base, when the reptile finds itself suddenly left with a stumpy, silent appendix, with only a few chinks in it, and has to wait for several moults until the rattle is again in working order.

A large, well-conditioned rattle can make a shrill noise like an alarum-clock, and so loud that when its owner is confined in a room, it makes conversation well-nigh impossible. The rattle grows with its broader sides arranged vertically, not horizontally. The snakes rattle only when coiled up, with the tail-tip standing up erect in the centre; whilst gliding away

they are mute. There cannot be the slightest doubt (although there are theorists who have a horror of allowing the use of the reason to animals) that the rattle acts most efficiently as a warning, and is now intentionally used for this purpose. It is not only man that takes notice of it; horses and dogs are most susceptible, and, according to the natives, so also are stags, but these latter are said to trample these snakes to death, while the peccaries hunt them up and eat them. The best rattlers are the most phlegmatic; they know their own strong points, but give fair warning to be left alone, in order to avoid accidents which might be regretted by both parties, aggressor and defender. On the other hand, those which are mute, like the "palanca," are highly irascible, they will attack an intruder without further provocation, and are justly feared.

However, it is surprising to find how very few mortal accidents happen from snake-bite, either to cattle, or horses, or man—cases of the latter are confined mostly to inquisitive boys. Perhaps this is due to the fact that these snakes do not visit the huts, but generally do all they can to get out of the way. The average visitor to the country will probably never see a snake, and he may even travel for weeks, and conclude that snakes are rare. But after a few months of a life of varied incidents—*e.g.*, when he has seen them in the morning coming out of or retreating into the walls of the house, or, in accordance with their kind, beneath the water-tub in the kitchen, the palm-thatched roof of the hut, the log he may have chosen for his seat, or upon his path—he will concede that there are plenty of them, far too many, indeed, for his taste. But the fact is that snakes are not obtrusive; they are of a morose and retiring nature, and trust to not being seen in a dress which so well harmonises with their favourite surroundings, or else they retreat in good time, since they have both good eyesight and keen powers of hearing, and easily perceive the footfall of man, a rustle in the grass, or the cracking of a twig. If many are to be seen, they have to be looked for by someone who is in sympathy with their habits. We managed to collect forty-four different kinds, comprising several hundred specimens, but it was hard work, and, after all, this formed only about

forty-five per cent. of all the species which may be reasonably considered to exist in the States visited by us.

Not being aware of the natives of Tequesixtlan being Chontals, and to convey better to the boys and men some idea of the creatures that I wanted, I gave the Aztec and Zapotec names, which I had learned with some trouble. These were laughed to scorn, but the work of preserving, drawing, and making notes about the spoils afforded a good opportunity for a little instruction in Chontal. These people had a separate name for every kind of fish and lizard. Unfortunately, the Alcalde and the boys did not always agree, and such discrepancies often occurred elsewhere, so that one should be very wary in taking down the vernacular names. A few may as well be given here ; every name is pronounced with the accent on the last syllable :—

Small lizards in general are called " s-palá " ; the green iguana, " wish-tá " ; the black iguana, " stá ". Large lizards in general, " candimoló.

Snakes in general, " nio-fár," with the " r " almost inaudible ; the pit-viper that has no rattle, viz., *Lachesis*, is called " mangi-njá " ; whilst for the rattlesnake they professed not to have a special name, though this seems almost incredible.

Toad is " tahué " ; frog, " raná," and this they at once pointed out as Spanish.

Of fishes a large siluroid (*Pimelodus guatemalensis*) was called " mur-chuú " by the boys, but " ssi-toú " by the Alcalde ; " barbudo " in Spanish.

Sicydium multipunctatum, with the ventral fins transformed into a sucker, was called " camochín-bañó " by the boys, " morchoú " by the Alcalde. This proved to be a new species.

Philypnus maculatus, a gobioid, with projecting lower jaw, had as its native name " chokakó " ; " trompudo " in Spanish.

Cichlosoma aureum, a cichloid, had for its native name " tzilí " ; " mucharra " in Spanish.

Agonostomus monticola, a silvery-white, large mullet, had as its native name " ssa-paná" ; its Spanish name is " trucha," *i.e.*, trout.

Tetragonopterus æneus, a characinid, is the "libá" of the natives; "sardina" in Spanish.

Poecilia sphenops, a tiny cyprinodont, bright blue with red spots, was "bof-tuú"; "tripon" in Spanish.

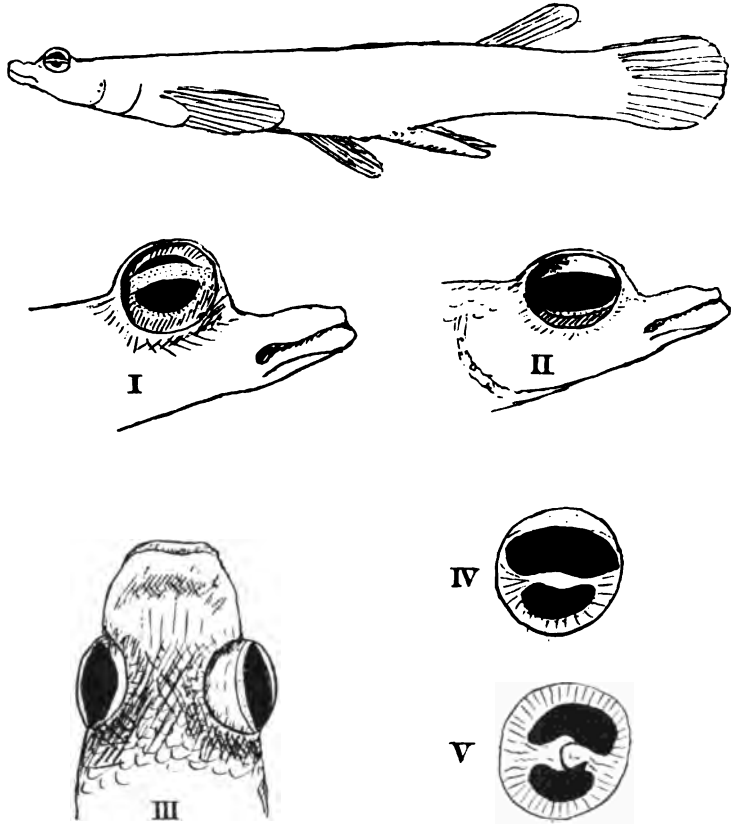
Anableps dowei, a cyprinodont, the "four-eyed fish."

In Spanish this fish is known as "quatro-ojo"; the Zapotecs call it likewise "four-eye," "tapa-iyaloo," and hence has arisen at Tehuantepec the curious hybrid word "tapa-ojo," literally "cover-eye," which also gives good sense. The Chontals at Tequesixtlan know it as "palgan-divi" ("divi" = eye), but I could not find out the meaning of "palgan," except that it does not mean "four."

Anatomically, the modifications of this fish's eye are easy enough to understand.* The iris, instead of forming the usual circular curtain, is produced into two flaps which freely overlap each other, so as to form horizontal bars across the pupil, which is thereby divided into a lower, roughly triangular, and an upper, elliptical, cavity. Corresponding to this broad bridge, which is movable, so that the overlapping flaps can alter the shape of the pupil, there is a slight modification of the cornea in the shape of a grey and reddish pigmented band, and this projects slightly on the inner side of the cornea. The lens is pear-shaped, and thus the thicker, larger, and less curved portion fits into the upper pupil, while the lower part of the lens is smaller, and also more convex. Consequently, it stands to reason that the light which passes through the lower pupil is received by a stronger lens, which thus counteracts the greater refraction of the water. The fish has indeed a double pair of spectacles, one for seeing at a distance and in the air, the other for close work in the water!

So far as I know, none of those who have described this wonderful apparatus have ever watched a live *Anableps*. The whole of the eyeball, which protrudes considerably on the upper side of the head, is as freely movable as any ball-and-socket joint. It can be turned in almost any direction, the fish looking, in the same manner as a chameleon, up and down,

* Meckel, "Archiv. f. Physiol.," IV., 1818, p. 124. Valenciennes, "Cuv. et Val. Hist. Poissons," XVIII., Pls. 538 and 539.



Anableps dowei, THE FOUR-EYED FISH.

I. Using the lower half of the eye.
II. Using the upper half of the eye.
III. Seen from above, upper half in use.
IV. Iris and divided pupil, outside view.
V. Iris dividing the pupil, as seen from inside.

or forwards and backwards. When the eye is turned completely up, all the white of the upper half of the cornea disappears; again, it can be turned down so far that the upper pupil looks quite horizontal, and then the lower apparatus altogether disappears within the socket. When swimming, the fish incessantly moves its eyes, which, when near the surface, protrude above it, the white of the cornea shining conspicuously, a sure sign that only the upper, or air-eye, is then in use. When the fish was below the surface this play of the eyes could, of course, not be observed, owing to the generally turbid condition of the water. But we kept specimens for many hours in basins, or in glass jars, and then the lower half of the eyes was mostly used.

These fishes have rather curious habits. They congregate in schools of a dozen, or even of several scores, in the more quiet bays near the river banks, preferably below a sandbank, or at the edge of backwater eddies, where scum and flotsam collect, upon which they feed. Favourite resting-places of theirs are quiet shallows, where they lie, apparently resting upon their stout fore-fins, with their knob-like eyes alone above the surface. They are shy, rapidly scuttling or half-hopping away into deeper water, where they form up abreast in platoons, swimming up-stream, propelled by the tail, with the fore-half of the body raised, and some even jumping up; but they are always anxious to quit the rushing of the stream, and, after a few minutes, return to their favourite anchorage, where they also seem to spend the night. Like many of the Mexican freshwater fishes, they are viviparous, and although a large female rarely reaches ten inches in length, the ripe young, from a few in number to a dozen, are two inches long. In the male the excretory and sexual passage is continued into a long perforated cone, which is covered with scales, is directed backwards, and carries the much-reduced anal fin with it on its dorsal side.*

Dowe's *Anableps* is restricted to the low-lands, through the whole of Central America, from Panama to the Isthmus of

* Wyman, "Proc. Boston Soc. Nat. Hist.," 1857, p. 432. Garman, "Mem. Mus. Comp. Zool.," Cambridge, Mass., XIX., 1895, No. 1.

Tehuantepec, both on the Atlantic and on the Pacific side. The largest specimens that we saw were in the San Juan river; many smaller ones were in that of Tehuantepec and its tributaries. In South America they are represented by another species, *A. tetrophthalmus*.

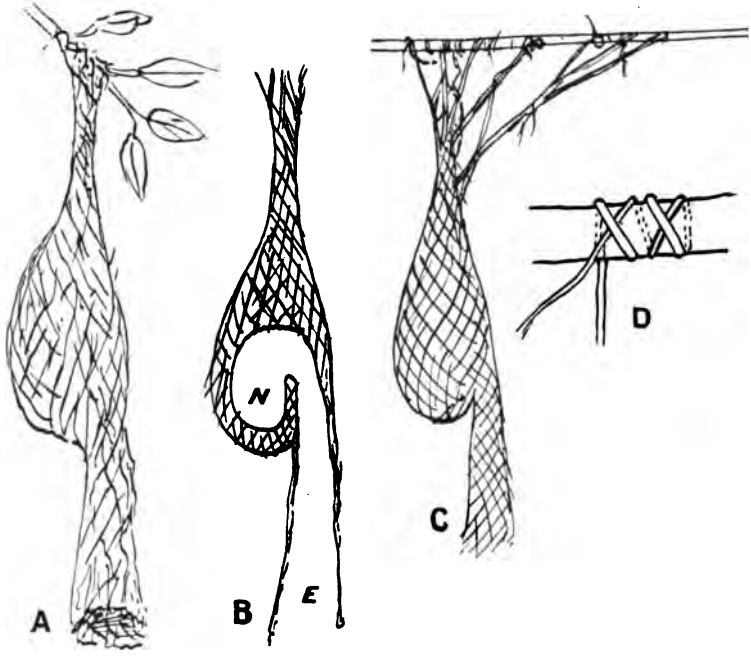
Life was quite pleasant as viewed from the verandah of the "curato," although it was hot, the shade-temperature in the north rising to 90° F. at 9 a.m., and being only one or two degrees lower at 8 p.m.; even before sunrise it stood at 79° F., but a north wind sprang up regularly at about 9 a.m., dying

VIEW FROM THE CURATO, TEQUESIXTLAN.

down after sunset, or continuing well into the night. This breeze, combined with the very dry air, made existence quite tolerable, only the sun was very fierce. Soon after sunrise a flock of "zopilotes," which used to sleep in a tree near the house, hopped on to the ground and spread out their wings for a thorough baking in the sun, although there was no dew. They also took a bath in the river, where they searched for dead fish, molluscs, and worms. In the same tree were a number of long pendent nests of weavers, or hangnests (*Icterus*).

On various occasions, here in Oaxaca, and again in Guerrero, these birds gave proof of their mental power in adaptation.

Their object is to suspend the nest from such a thin and long branch that it cannot easily be reached by tree-snakes and opossums. Therefore, what can be better than the telegraph wire, which goes in a bee-line across the country? Now, most of such nests were fastened in a peculiar way: instead of being



NESTS OF MEXICAN ORIOLE.

A. Usual mode of suspension.
B. Section through the nest. E. Entrance; N. Nest.
C. Mode of suspension from telegraph wire, with
D. The timber hitch for fastening a grassy fibre on to a branch.

suspended from one point, several plaited or twisted side-strands were thrown out from the main rope, and slung round the wire so as to make the base very broad, and thus to secure a better hold upon the wire, a hold firm enough to prevent the nest from being blown along the wire, or shifting its position; moreover, the nests were slung at long distances from the poles, thus affording absolute safety. This had by no means become

the prevailing fashion, but we saw about a dozen nests thus fixed in various districts.

Humming-birds were also plentiful. Although they may be met with anywhere in Mexico, from the sea almost to the upper limit of the tree-line, to an altitude of 13,000 feet or beyond, they are local, absent in thick forests, and prefer a varied terrain and the neighbourhood of water. They often take a bath, ducking themselves right under water to get a thorough wetting. Here at Tequesixtlan some long-billed species used to hover over the river catching flies, then perched on a favourite branch, darted into the air to snatch an insect, and perched again. They are rather quarrelsome, tilting at each other in the air, and they attack other birds, much larger than themselves, in the same manner. Apparently, although wary they are quite fearless, and this is the outcome of their marvellous wing-power, these lovely creatures flying like swifts, to which they are closely related, or, again, like wasps and moths. Some of our hawkmoths bear, indeed, a striking resemblance to the smaller humming-birds, when they seem to stand immovably in mid-air in front of the long calyx of a flower, whilst, instead of their wings, all that is visible is a transparent blur. Again, they shoot suddenly either towards right or left, just visiting perhaps a neighbouring flower, and returning within a second or two to the first flower, unless they are off altogether, when the glittering little beauty—with its metallic colours changing prismatically according to the direction of the light and the position of the spectator—may, perhaps, next be seen sitting motionless on a branch, with its straight bill pointing upwards. It is during these sudden side-long darts that some of their species, not all, emit a short but rather loud noise, sounding like "oom," a fact which has given them their English name. The Mexicans call them "colibrí," like the French and Germans, or "chupa-flor," "chupa-mirto," "chupa-rosa," "chupa-miel"—*i.e.*, flower, or honey-sucker—or "pájaro-mosca," "fly-bird." The Aztec name is "huitzilin," *i.e.*, the "spikelet." * The mask of this bird was an important

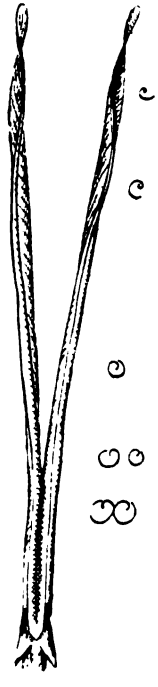
* Or "huitzitzilin" = spike-humming. "Huitz-tlacuache" is the spiny tree-porcupine (*Synetheres mexicanus*).

attribute of the principal deity, the god of war, and chief patron of the Aztec tribe, Huitzilopochtli, which means the humming-bird of the left, or south. The god was always pictured in a mask of this kind, with a human face peeping out of the bird's chest.

Humming-birds are still, in various parts of the country where Aztecs live, prized as powerful charms. To gain the affection of one's chosen lady it is sufficient to carry a dried bird in the folds of his sash. The metallic feathers are much used for the exquisitely beautiful and well-finished feather-work designs which still form a lingering industry, especially in the larger towns, where the outlined birds, heraldic, and other designs are eagerly bought by the tourist. A whole bird, either large or small, complete from bill to toe, and with even the branches and leaves upon which it rests, is made up from carefully selected feathers, and fastened on to cardboard, and these mementoes are everlasting, if framed and kept safe from insects.

The nest is a delicate little cup, fastened on to a horizontal branch, and covered outside with lichen; the bulk of it is woven from fine, silky, vegetable fibres, and within it two white eggs are laid. The young look almost exactly like those of swifts and swallows, including their widely-gaping, short, flat bill, which assumes its long and pointed shape much later. The females are much more sombre in hue than their mates, but by no means all the species possess beautiful colours. Humming-birds constitute an altogether Pan-American group of birds, being absolutely restricted to the New World and its islands, and at the same time ranging, during the summer in each respective locality, from Canada to Patagonia. More than four hundred species are known, and these are of almost endless variety in shape and colour of plumage, some with short and square, others with long forked tails, some with feathery crests, or with white puffs on the legs; with short bills or enormously long ones, even surpassing in length the entire remainder of the body and tail. From the evolutionist's point of view they are glorified and specialized swifts, adapted to hover in front of flowers from which they extract the tiny insects

upon which they live. The length of their bill stands in direct co-relation with the kind of flowers which are their specific favourites; those which visit long trumpet-shaped flowers have the longest bills, and many kinds are said to be absolutely dependent upon certain flowers, perhaps because these are inhabited by certain kinds of insects. Consequently, these flowers have produced humming-birds to fit themselves, and possibly their visitors benefit the hosts in turn by acting as fertilizers. Not only is their pointed, slender bill always rather long, but their tongue also, and this can be protruded like that of a woodpecker, although not so far, the hyoid horns being so long that they curve from behind round the whole head, the tips ending loosely beneath the skin near the nostrils. The tongue proper is short, but its horny covering is elongated into a pair of thin blades, which throughout their length are curled up, so as to form two parallel hollow tubes. Their use is not quite evident. Obviously, narrow tubes would be meant for sucking honey from the flowers, but these birds do not live on this nectar, and their stomachs are always filled with insects. Their tongue finds an almost exact counterpart in that of the sunbirds of the Old World, which are likewise insectivorous, a remarkable instance of convergent analogy. Probably the long sheaths of such tongues are used for dislodging the insects in the depth of the flower, whereupon they are caught by the bill, which in many humming-birds has slightly serrated edges. The tongue-tubes are narrow enough to suck up fluid by capillary attraction, so that the nectar may well ascend, and perhaps the birds drink in some such manner.



TONGUE OF A LONG-BILLED HUMMING-BIRD.

The circles on the side represent sections. (½ Nat. Size).

The keeping of humming-birds in captivity has hitherto always failed through their starvation.

On the first night, when not yet familiar with our immediate surroundings, we came near committing a dreadful and foolish act. The dogs of the village had been restless and fell to fighting in the shrubs, and there followed a sound like that of crunching bones, with deep sniffing and growling. " Don Juan, el tigre esta comiendo á un perro ! " But it was not a jaguar eating a dog. Just in time, whilst trying to get a sight with the rifle, some doubt misgave me ; the two gleaming eyes under the bush were so far asunder—in fact they were as wide apart as they usually are in an ox which is chewing the cud !

The cura arrived at the week-end, but would not allow himself to be drawn into talking about the customs and beliefs of the natives, he being supposed to have eradicated all that ; but he was not in sympathy with them, nor they with him, and he knew less about them than the Zapoteca schoolmaster. Otherwise he was very affable, and over some wine, which Mateo had procured from the shop, to mitigate his partial eviction from his own verandah (which, however, belonged to the municipality), he confided to me that a friend of his suffered from pimples on her face, and asked if this could not be remedied. He did not seem to like my chaff, and made some remark about heretics to whom nothing was holy.

A very stout wealthy native lady came to pay us a visit, and it was my good luck to be able to relieve her of some of her troubles. Next day she sent her servant to report her convalescence, with a basketful of choice fruit. This little incident would not be worth mentioning if it did not illustrate the marked difference in the behaviour of the people of the State of Oaxaca and that of Guerrero. Naturally, we gave freely of our stock of medicines, and rendered whatever help we felt justified in doing. Here in the State of Oaxaca, without exception, the natives wanted to pay us, and since this, of course, was always refused, they usually managed to get even with us by means of some invariably acceptable offering. In Guerrero they first enquired about the cost, and rarely, though this was not without exceptions, showed any gratitude.

The day of our departure from Tequesixtlan was full of little incidents. Horses and mules had been procured without difficulty, and we went merrily along what was still a tolerable track. At a brook, which possessed pools of beautiful water between the volcanic rocks, we waited for the baggage to come up, and my horse, hitherto so lazy, ran away. Fortunately he scattered everything about ; kodak and knapsack, a calabash with live lizards, and a piece of the lasso indicated the trail for a while, but next came a swamp with ever so many bittern looking up at the intruders, and then the river broke up into a network of channels and islands, which put an end to the chase.

Meanwhile my wife had prepared lunch, but said she did not like the spot, on account of a queer noise close to the zarape which she had spread out as a tablecloth. This proved to be somehow due to a snake entwined between the plants, which refused to be dislodged, and retreated under a ledge of the bank of the stream. Thence it made several counter attacks, coming half out of its cave with head and neck erect, and driving me off, so that I just missed those lively coils several times in succession. At last it darted out as straight as a lance, and tried to run away, when by a lucky fluke a bullet broke its back. It was a *Coluber corais*, a few inches more than eight feet long, and as thick as a man's arm. Then the origin of the noise became clear. This snake, closely allied to the black racer of the United States, *Coluber*, or *Pityophis melanoleucus*, has a peculiarly modified epiglottis, which is set in vibration by means of the air expelled from the large lungs, making an almost voice-like noise, very different from the usual hissing of snakes. As some of these *Pityophis* are of a bold and fierce disposition, this sound is perhaps made for the purpose of intimidation.

The muleteers were sent after the runaway horse, Mateo was to wait for them, and we went on to a little place called Las Vacas. It consists of only a few scattered houses in a prettily situated valley with plenty of cattle, whence its name "the cows." The people were friendly, but had nothing whatever to give besides tortillas and "jilotes," or corncobs, and as they did not like taking in such a strange couple, whose

possessions consisted of next to nothing, we had to make the most of one zarape, and to camp in the middle of the meadows well away from the village. It was a sultry, hot night, and the ground was warm, but there was a plague of insects on this cattle-haunted spot, and then it rained. Mateo came in shortly before midnight with half the baggage, the mule with the tent having broken down, and the runaway horse not having been found. Therefore back again we went with the empty beasts to bring in the straggler, which had toppled into a brook, strewing about the bundles, of which several had to be given up as lost.

In the morning one of the remaining mules was gone, and this made the second mule, of which no more was seen by our party. It had not been a night of rest, and then came a long and exhausting ride, with a few short pauses, until, at sunset, a suitable camping-ground was found near a deserted house on the other side of San Bartólo. The scenery all through this long day was beautiful, the track leading over grand, mountainous country. It was a district full of the columnar cactus, with oak woods higher up, and, lastly, pines; but although the views from the ridges were fine and the air at an elevation of from 2,000 to 3,000 feet was exhilarating, though hot, the reaching of each ridge only implied another descent, and there seemed to be no end to them, as they appeared one piled upon the other, till lost in the shimmering distance. Except for a forlorn hamlet or two, there was no human settlement all along that ride, and the only people met with were a string of muleteers with cargoes of apples, which they were bringing down from the plateau to the coast.

On the bark of an oak-tree sat the most curious-looking object imaginable, a white fluffy thing, like a little bunch of cotton attached to a reddish body, which dodged to the other side of the tree. Within a few minutes after it had been put into a tube with alcohol, all the long white fluff dissolved away, and all that was left was a reddish insect, the rare *Phenax mexicana*, a member of the *Fulgoridæ*, whose fluffy excrescences all over its body, and streamers several inches in length, are said to consist of some waxy matter.

San Bartólo is a large village, and the people, perhaps a mixture of Chontal and Misteca, do not like strangers, be they white or brown. There is a "meson"—*i.e.*, a subsidised house—where shelter has to be given to the wayfarer, and the people are in the habit of taking prepared meals thither, not allowing the so-called guests to enter their own houses. Nor did we succeed in getting more than a glimpse of the inside of that of the head-man, a very determined little fellow who suffered from St. Vitus' dance. He offered the "meson," as he was bound to do, and as that was declined with thanks he took us to the outskirts, to a spot where there were two empty houses, the inhabitants of which had recently died, and informed us that our neighbours, not far off, were "gente de razon," "people of reason"—*i.e.*, no longer savages, for whose good behaviour he would stand responsible.

There the tent was put up, and we took a day's rest, but in spite of the elevation of some 2,500 feet it was frantically hot and stuffy. Although Mateo and I prowled about most of the day, scarcely a creature was to be seen. The people, with their independent nature, seemed to have their municipality on the brain. About a dozen of them were always sitting and lolling under the verandah of the town hall, on the pillars of which were hanging the wands of office, each with a leather strap through a hole at the top end, and every stick different from the rest. Everyone who went, or was sent on an errand, first selected one of these sticks as the symbol of his authority, and they insisted on this custom so much that a man, despatched to fetch someone who was supposed to know a good deal about animals, would not leave without the stick appropriate to the occasion. These wands of office are an institution of the early Spaniards in various parts of Mexico, and every year the "stick-giving" day is a solemn occasion, corresponding with the appointment of the various municipal officers by the Prefect of the district, to whose seat they are compelled to repair. These wands are sacred, and some of them are of great age. In the town hall are suspended long lists of the names of all holders of office and their substitutes, from the President of the municipality of several villages, the alcalde,

ANCIENT AND MODERN IDOLS AND ANCIENT POTTERY.

Top Row: Fish (Lava)—Idol from Totolapan—Figure of Woman (Lava)—Copal Incense Burner (Limestone), ornamented with the figure of three musicians—Human Figure (White Marble)—Two Clay Figures from Teotihuacan—Bells of Clay, in the shape of the Virgin.

Middle and Bottom Rows: Jugs, Whistles, Dishes with ornamented feet: on right side, a piece of Lava, roughly shaped into an animal's head, for grinding chili.

"regidor," or justice of peace of a village, the syndic, or chairman, and the vice-chairman, down to the dozen members of the local council, and even their police and messengers. All this was in a village inhabited by none but pure natives, few of whom speak Spanish, and who have the reputation, as the Prefect of Tehuantepec told me, of being frantically idolatrous, though outwardly, of course, good Christians.

They flatly denied having ever heard of, or seen, ancient pots and clay-figures, though, as a matter of fact, on the eastern rim of the valley, at a considerable height above the village, stand the ruins of an old Zapoteca fort, with big stone walls, well constructed, and mortared like those of Quiengola, where the people still search for such idols, but these are either buried again, or adopted and guarded jealously. The schoolmaster, who was, as usual, a Zapotec, had been educated in Oaxaca, was a reasonable fellow, and took an interest in things around him, but he had to be careful, and would have been less communicative if he had not been so fond of a little conviviality. This was easily arranged, since his sprightly wife was managing the best shop. The "maestro" had a quaint sort of humour, and he explained that, filling a position of dignity as the only learned person in the village, he felt it incumbent upon himself to entertain strangers, but that he suffered from an illness which sometimes interfered badly with his duties. The symptoms were great sickness of stomach, headache, and disinclination to work, always coming on over night when least expected, after he had been as jolly as any. Could I diagnose the malady, and did I know a remedy? "Oh, yes; it's a well-known complaint that is sporadic in every country, and goes by many names, such as, for instance "hot coppers," and "katzen-jammer," which terms, when explained, he thought described the symptoms very well. "But do you know a remedy, or, better still, a medicine or a diet which will prevent it?" "Yes, one that is absolutely infallible: 'no beberes'! Thou shalt not drink!" "I have told you that a hundred times," said his wife, and we had the laugh of him, but he went on expostulating that he never did get drunk, and that was the worst of it; if he did, like other fellows, he would not have

asked me ; but for a man in his position, who went to bed all right, to wake up ill in the morning, that was quite another matter.

This man had constructed and neatly drawn a map of the road from Jálapa to Totolapan, which I joyfully copied as a valuable guide. Unfortunately it was drawn with a sort of perspective, a foreshortening of the distances towards the north ; yet it was more correct than were the printed maps it had been our bad luck to have to trust to. He also helped us by trying to persuade the people to catch a *Helodermu*, or "gila monster," or at least to show us the spots where it might be found. I held an assembly at the blacksmith's, showed them the coloured drawings of the creatures wanted, and some of them were recognised. However, we could not penetrate the curious labyrinths of the Indian mind. "How much will you pay for one ?" "Two pesos." "Good gracious, what can be the use of a beast which is only worth killing ?" "To make medicine of." "What for ? Can you cure dropsy with it ?" The obvious answer was : "'Quien sabe'—I have to study the beast before I can tell ; we have none of them in our country." "He is right," said one ; "there may be strong medicine in so poisonous a beast, but how would that benefit us after you have left ?" "You, or anyone else, will benefit to the extent of two pesos if you bring one here." "I should not touch it, it is dreadfully dangerous, and if you crush it with a stone and the blood squirts out you are a dead man." "Never mind us, locate one, and we will fetch him ourselves. Do you think you could find one for two pesos ?" "Certainly ; I know where they are ; when my father . . . ." At last the man was willing to spend a day in hunting for this particular snark at two pesos, and turned to fetch his "machete." A few minutes later he hurried back ; "Sir, I shall not go ; if I do not find one, what then ?" Such negotiations were enough to drive one mad. None of the company—excepting the schoolmaster, and maybe the Presidente, who said that it was none of his business—could grasp the distinctions between the three possibilities, that of getting money down for a beast produced, and of money for searching with, or without, result.

Moreover, if an Indian does not want to give an answer, his facial expression is unchanged, and remains either smiling or sullen as the case may be, but his eyes become as glassy as in the moment of death, a film passes over them, and no white man can tell whether there is a soul behind it.

Mexicans divide the Indians into " gente de razon "—reasonable people, who can or are willing to understand another's thoughts, and those who are " cerrados "—" locked up " in their own thoughts, unmanageable, unapproachable. The distinction is good, the expression " gente de razon " is still better. The distressing feature of not being able to entertain two thoughts at a time is not peculiar to them. Amongst ourselves we, too, have many monkey-eyed people whose reasoning snaps if it is applied to a chain of argument. They revert to their first thought, with the same serene calmness as the Indians do to their single thought, the only difference being that our white brethren may run to the length of three links in the chain before breaking down, while the Indian stops at the second. It is not always unwillingness or laziness, it is want of capacity. As a glimpse into the working of another person's mind is always interesting, let us have some more examples which are, likewise, not fictitious. It was on this same high road, between Oaxaca and the coast, where caravans go up and down daily. A small pedlar with only a single donkey-load of apples would not sell that load, or even half of it, before he reached his goal at Tehuantepec, the advantage of continuing with a lighter load would not be grasped. At San Carlos we got into a difficulty about hiring animals, and it so happened that two strings of carriers, with empty pack-saddles, overtook us, and they also were bound for Oaxaca. Would they take our baggage ? No, they were returning to Oaxaca for a new cargo. Were they pressed for time ? No. Did they never take cargo up to that town ? Certainly ; but only from Tehuantepec where, as on this occasion, they did not happen to get any.

Perhaps it was the beauty of the morning and the profusion of ferns and flowers on the moist banks of a shady ravine beyond San Bartólo, where a narrow belt of limestone caused a change

in the porphyritic formation, that made us feel happier in our minds, but a succession of stumbling rides of seven or eight hours on bad horses and bad saddles, and with nothing to eat, is apt to become monotonous. Water fit to drink was not always easy to get; there were diseases about in the villages, and often the water had an alkaline taste. It was necessary to drink much and often in this hot and dry air, which was so dry that the incessant perspiration evaporated at once, deceiving us as to the continuous loss of fluid that we experienced. Boiled water alone is nauseous when taken lukewarm; very weak tea with sugar and some of Horlick's milk-powder was better, but liable to turn sour before the afternoon; thin coffee treated in the same way behaved similarly, and was too heating. On our second expedition through tropical Guerrero, water flavoured with the rind of the very aromatic small wild lemon with a little of its acid juice, and sweetened when taken, was by far the best refreshment during the march.

We hired eight mules for as many pesos, including three natives, who were considered necessary by the authorities. Again, at about 3,300 feet of elevation the first oak-trees were encountered, and at 3,800 feet they became regular forests, mixed with the long-leaved pines and a sprinkling of arbutus trees, whilst cassias and jacquinias fell behind, showing that we were passing out of the tropics. Lizards were plentiful, and the size of *Sceloporus horridus* was remarkable, several specimens of the kind being regular giants of at least ten inches in length, but, in spite of our efforts, these large creatures always escaped, and we were anxious to get to San Carlos. This is a "town," the seat of the district called San Carlos Yautepec. For the sake of preserving complete independence we camped a mile above the town, on the road-side. The Prefect, in spite of our official letter from the Governor, and the friendly note from his colleague in Tehuantepec, proved a failure, as he was too busily engaged in deciding upon the pattern of a paper-cap that was to be worn by his guard on the approaching national anniversary. In his office was displayed the usual information that the sole idiom spoken was Castellano; this was strictly

true when those were left out who spoke only the "serrano" dialect of their native tongue. Then there was the usual list, professing to give in leagues the distance of every village from the seat of the Prefect. None of these are correct, and sometimes the explanation is added that the leagues are "buenas," or "chicas," full-grown or still young, as the case may be. That the total of a long distance does not tally with the details given does not matter. "These are the official distances as laid down by the municipality, and you won't arrive a day sooner in Oaxaca by altering them." The ascertaining of distances, difficult everywhere, was a sore trial all along this high-road of commerce. The people in the villages, of course, had their practical notions, although expressed neither in hours nor leagues, but the answers of anyone met on the road were hopeless. None of them intended to deceive: they simply could not express it. "Esta cerca"—"it is near by," invariably meant a long way, sometimes as much as three hours' march, whilst "muy lejos"—"very far," once happened to be round the corner, within a mile; "todavia falta algo"—"it still wants some," could not be found fault with as being strictly true; but "un pedazo"—"a step," was bad, and "un pedacito,"—"a nice little step," was usually worse. Poor Mateo declared they were mad, and suffering from swollen heads: "Don Juan, when these Popolocos have learned how to read and write a little, they think themselves better than their betters." Popoloco is the Indian name of a still backward tribe to the west of Motzorongo, and it was his favourite term for such as he did not like; moreover, "loco" being the Spanish for "mad," the resemblance in sound tickled his fancy.

At an eating-shop of San Carlos were easily picked out two pale, thin, unhealthy-looking fellows, very different from the usual Mexicans. They were Catalans on a walking tour from Mexico City, to take photographs for a publishing firm in Barcelona, and they were bound for Buenos Ayres, which they hoped to reach in about two years! It seemed to be the scheme of some Pan-Hispano-American propaganda. What unique scenes these courageous fellows might take and send

home ; but fancy entrusting therewith a couple of uneducated men ! They brought the bad news that in the village further north small-pox was raging.

The " Presidente municipal," whose business it was to procure the necessary animals for our party, according to emphatic orders from the Governor, returned such a haughty answer through Mateo that we decided to give him a lesson. It was a silly thing to do, but our pot of patience boiled over, and it cost us four hours' hard work of storming and threatening. But it did good for the next stage or two. The usual cost of hire of an animal, be it saddle-horse or pack-mule, is one peso per day, regardless of the distance ; the "arriero," who walks on foot, is included in the price, and so is the food for himself and his animals ; no charge is made for the return, and if any such attempt is made it is simple imposture. Thus the eight animals, with two men from San Carlos to Totolapan, cost sixteen pesos, the official distance being fourteen leagues, about forty miles, or two days' march. Since then " arrieros" are expected to find the food and fodder, most of the money should not be paid until the end of the journey. Sometimes payment in advance is insisted upon by the authorities, and in that case the " arrieros " start without a centavo, and the traveller will find that he has to keep them and the animals.

The repeated hiring was by far the greatest worry during the whole journey from the coast to the plateau. It is easy, almost everywhere, to get one or two serviceable saddle-horses for a day or two, but the trouble assumes alarming proportions when more than half-a-dozen animals are required. No single person possesses such a number, and the people, out of sheer cussedness, and in order to show their independence, refuse to let them out ; moreover, each owner insists upon sending his own man with his beasts, not trusting another, so that six pack animals may, in complicated cases, mean as many followers. The village authorities are bound to respect the governmental order to procure the men and beasts, but if he feels so inclined the head-man tells you that there are none ; or that some happen to be away on pasture ; anyhow, that they cannot be got together until the day after

to-morrow, and if you insist upon having your half-a-dozen mules ready by to-morrow they will be ready, but one of them will be a broken-down horse, another will be a similar beast with sores too terrible to behold, and a third will be a donkey. This assortment will be sent to your camp, but without any pack-saddles, without which they are useless, and if then you walk into the village and at last find the chief, to storm and to threaten, he calmly says that he told you yesterday that they would not be ready before to-morrow. These men were not all like this; some few were good, others a great deal worse. An additional difficulty in our case was that it was not possible to hire the whole outfit for the whole distance, and, partly owing to the variety of tribes, they refused going beyond their districts. Having to travel with eight animals and two or three followers, all of whom had ultimately to be fed out of our own pocket, especially if one decides that the march should stop for a day or two at some attractive spot, it becomes rather expensive, the whole bill easily amounting to a pound per day. For a longer journey it is, therefore, more economical to buy the animals outright, and to sell them again. They are cheap on the plateau, and worth much more on the coast. The horses which are bred on the airy highlands stand the tropics pretty well, for a time, but do not produce any good offspring, and these, too, when transferred to the plateau, are susceptible to chills, and have trouble with their wind.

CHAPTER XI.

FROM SAN CARLOS YAUTEPEC TO THE SOUTHERN PLATEAU.

A District smitten with Small-pox—Dismal Camp—The Cactus Family—Totolapan—Idolatry and Native Beliefs—Interesting Pedlars—Character of the Edge of the Plateau.

The next stages from San Carlos were terrible, since in nearly all the villages and hamlets along the track there raged small-pox of the virulent black and confluent kind. It is no exaggeration to say that people were dying on the roadside. The huts in this somewhat poor district were loosely, and often carelessly, constructed reed shanties. Outside some of these, in the little court-like enclosures, we saw lying on the ground both men and women, some in the shade, others left in the glaring sun, in the last stage of the disease, with their relations squatting round them in dumb despair. This had been going on for several weeks; naturally some had recovered—at least, many of those that we met were in the peeling stage—but many huts were deserted, the reed-curtains used as doors being left open and aslant. The entire population of one village was said to have been exterminated, with the exception of a little girl who was found there, and who, when rescued, was quite prostrate by starvation. Yet there had been no stampede, the people stoically waiting for what was going to happen; in some villages they had had a few sporadic cases, and after the victims of these had died, the remainder were left in peace. It was uncanny to have to spend two days in such a district, and heartrending to have to look on at this misery, and to have to prevent our party from entering into intercourse with the stricken population. Of course, we had been re-vaccinated,

we always are, with the result that the hungriest of small-pox bacilli cannot find anything to live upon in our bodies, but it was gruesome to see how the infection was carried about. What a suitable place that village of the dead would have been for an indignation meeting of our anti-vaccination cranks! It was an unusually bad outbreak of small-pox, which occurs everywhere in the country to a moderate extent; many people in Mexico are marked, and they are not, as a rule, afraid of it. A few days later, in Oaxaca, Mateo happened to get a letter

SMALL-POX.—DESERTED HOUSE.

from his wife, complaining that the children were ill. He calmly shrugged his shoulders and said: "Maria need not make such a fuss; I am sure it is that small-pox, everybody gets it sooner or later, and there is no epidemic in my own district"; he knowing well that the disease, where already established, is usually of a mild character, but that the "outbursts" are of a dangerous type. By the way, small-pox was introduced originally by Cortez's soldiers. The governments of the States provide for vaccination, and a few thousand individuals are annually reported to as having been successfully vaccinated, but that does not concern the overwhelming majority; for in cases

where the native is asked to pay, he refuses, whilst what is offered free of charge he does not value. To get hold of the people in the remoter districts, who will not even submit to a regular census, would be as easy as tying a bell to a jaguar's tail, and about as pleasant to the operator.

It was not easy to find a suitable camping-ground, as the plateau, which was of more than 3,000 feet elevation, was covered with rough lava, or strewn with porphyritic rubble, and was without water; we should have preferred camping away from the track, and even from human habitations, but the only place available was on the shoulder of the plateau, at the edge of a deep ravine. Here, near the only well, and close to a solitary hut, where everybody had camped before, we had to stop. Fortunately, I was curious enough to inspect the well myself; it was the most stinking waterhole imaginable, swarming with insect larvæ, tadpoles, and algæ, and with a strong mineral taste, so nauseous that one could not drink it even in tea, but only in strong coffee, which kept the whole company sleepless. The animals and the "arrieros" fared worse, as neither food nor fodder was to be had in this stricken district. The ground was strewn with flakes of opal, whole veins of which existed in the neighbourhood. In Mexico, especially in the capital, the cutting and setting of opal ornaments forms quite an industry, but the best Mexican worked stones are imported from the Old World, to supply the considerable demand by tourists for genuine mementoes.

THE CACTUS FAMILY.

The descent to the bottom of the ravine was made by a zig-zag path, so steep and precipitous at many points that it is a marvel how heavy loads can be taken up the five hundred and odd feet of the ascent. The steep slopes of the winding ravine were covered mostly with thousands and thousands of some kind of columnar cactus, related to the species which is aptly named *senilis*, on account of the white fluffy bunches of hair which cover the top of the plants, many of which were thirty feet high. The branching organ cactus grew on the ledges; on less steep slopes these were mixed with opuntias,

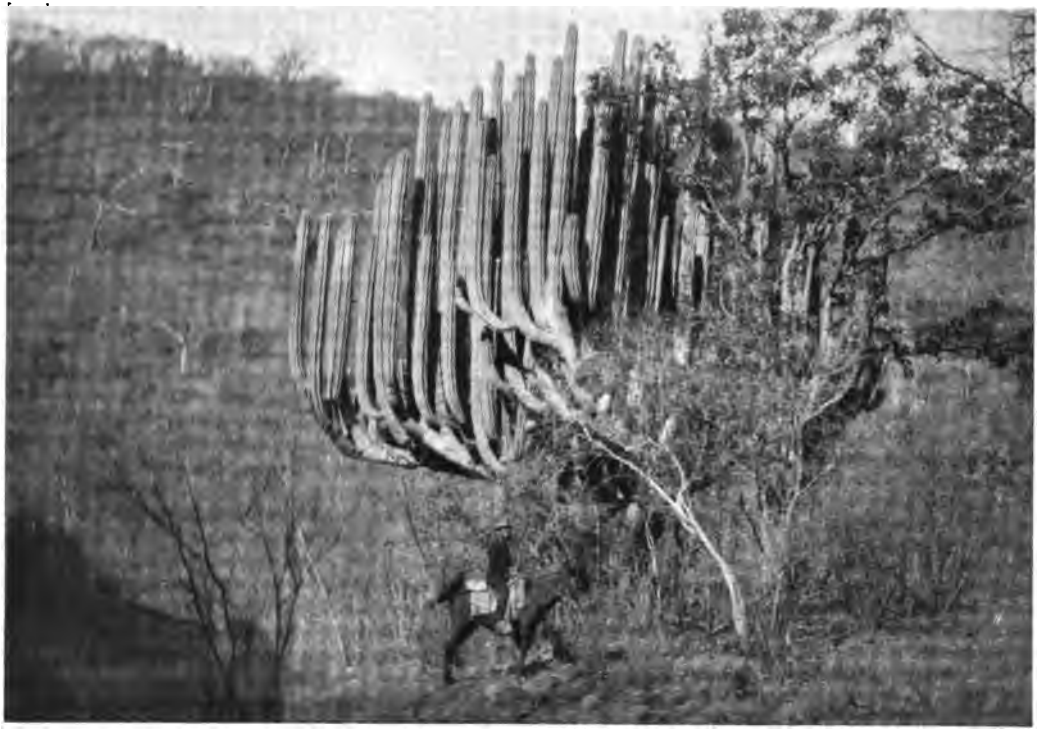
the globular cactus, and thin, rope-like kinds. It was a land of cactus as well as of spiny mimosas.

Whilst the agaves intrude themselves upon the sight of the traveller, chiefly through the medium of the cultivated maguey fields, he need not be long in Mexico before he finds out that the plants most characteristic of the country are those of the cactus family. More than one thousand different kinds have been described, all exclusively American, but their greatest abundance and variety is reached on the table-lands of Mexico. Cacti, of some form or other, are sure to attract attention whether in the shape of enormous candelabras, of solitary columns or pillars, such as those which in thousands cover the mountain slopes and precipices; of globes, varying from the size of a marble to that of the huge cushions strewn invitingly over the arid and stony plain; or of the rope-like "snake-cactus," entwined around or between the rocks, and even suspended from the trees. Wherever it is hopelessly dry and arid, some kind or kinds of cactus are sure to flourish; but there are also in the savannahs many cacti of tree-like growth, forming the centre of a tangle composed of many other plants, the whole clump looking as if it owed its existence to the central figure. Even in the dense forests itself cacti are not absent, and if the place is too moist the *Cereus* not only climbs into a tree, but grows upon it; once rooted in the bark it hangs downward like a cluster of dark-green ropes. The blooms are mostly of a fiery red or yellow, and without scent, while those of the night-flowering kinds attract moths by their pure white colour and delicious perfume; some of these blooms are diminutive, and almost insignificant, others are of gigantic proportions; some plants produce but one bloom each, others, like the *Cereus giganteus*, are covered with thousands of flowers, a sight not easily forgotten. The hard wood of the dead plant, looking like the remnants of a crushed basket, is used as firewood; the fruit of others is sold for food at every market. Every household singly, and whole villages jointly, are surrounded by an impenetrable fence of some kind of columnar cactus, and even where none are actually visible, one has but to take a rest to be unpleasantly reminded of their former

presence by some spike or thorn, perhaps some three inches in length, straight, smooth, and hard as a needle, or curved and hooked like a claw, or so small and transparent as to be almost invisible, but making up for this shortcoming by tiny barbs which drive the irritating spicule deeper and deeper into the skin. I was told in Arizona that it was quite sufficient to remove a prisoner's boots to prevent him from escaping overnight, since no man who set any value on the use of his feet would venture to take the risk of a barefooted run across a cactus country.

We did not take to these plants; Mexico provided enough in the way of irritating sensations without them, and we admired their strange features with our hands so to speak, "behind the back." Still, this plant-family is full of fascinating interest, because of its wonderful adaptation to the peculiar circumstances under which its representatives live, and they have—if we may be allowed to personify them—either invented or hit upon dodges which have been carried far beyond the stage of actual necessity. They are "overdoing it" from a purely utilitarian point of view, and the new-fangled and somewhat mystical term coined to express this fact is "hypertely."

These plants have no leaves; the necessary chlorophyll is stowed away in the green rind of the stem and the branches instead. Water is stored in the interior in specially constructed tissues. All the leaves are transformed into spikes and thorns or hairs. To increase the surface area, both stem and branches are often crenelated, forming longitudinal ridges, and upon these ridges the thorns are so arranged that those of neighbouring ridges point across the intervening depressions, and thus defend the softer, unarmed, portions. Thus armed, and supplied, a typical desert cactus will flourish in arid, sunburnt places where drought is the prevailing feature, and where it rains normally but a few days during the whole year. A globe, or melon-shaped cactus is, of course, quite unassailable, though even the less formidable, but much taller, tree-like plants are also quite unclimbable. They are shunned by man and beast; at least, I have never seen a large lizard on any of them, let



ORGAN CACTUS.

alone a mammal ; but the ground beneath the clumps or hedges of opuntias is a favourite place of refuge to many kinds of creatures, which seem to know well that they cannot be followed into their spiky retreat. Humming-birds often visit the flowers, but these are short-lived. During the greater part of the year there is nothing to be got either out of or from a cactus, not even by insects, the absence of which is a further inducement to the lizards to leave these plants alone. Even the termites, which build their covered roads up and down well-nigh every tree, but seldom make use of these forbidding plants. Only one creature likes them, viz., the woodpecker,

VEGETATION IN THE SOUTHERN SIERRA.

which, by a stroke of genius, hammers out its habitation in the tall columns of the organ cactus. These look so soft and succulent that one wonders how their top-heavy growth can withstand a storm. But you may rock such a column of fifteen or twenty feet in length to and fro, and it will sway backwards and forwards without ever snapping off. Beneath the rind are about a dozen thick strands of woody fibre, some of the thickness of a finger, much interlaced or communicating with their neighbours, and of a surprising density and hardness ;

this framework, like that of a basket, surrounds a softer, pithy core. When the woodpecker has drilled his hole through this framework, the enlargement of the nest is a comparatively easy matter. Old stems assume a brown, rugose appearance, and a considerable amount of oxalate of lime is deposited in the tissue, this being in such quantity and so hard that it blunts the axe, and in stems which have been partly destroyed by fire the white mineral appears amongst the ashes in regular lumps.

Undoubtedly, the cactus plants are well " defended," and from this point of view they make a pretty illustration of the fitness of Nature's operations ; but it may well be asked who are the possible enemies against whom these armaments of barbs, hooks, and spikes have been constructed. It is quite true that the flat, thick, and uncouth branches of the opuntia for instance, contain much water, and that cattle eat them greedily. In some parts of the Northern States the people cut the branches down and rub off most of the spikes to assist the half-frantic, starving, and thirsty beasts ; asses and horses are said to paw with their forefeet at the globe cactus in order to get at the moisture from the under-side, but cattle and horses, sheep and goats, were all introduced by the Spaniards, and none of the indigenous vegetable-feeders of the plateau, such as stags, squirrels, hares, and mice, can claim to have helped in the evolution of these plants. Are we reduced for an explanation to go back to the extinct fauna ? More likely it is one of those cases in which imagination has run away from a more sober and matter-of-fact judgment. It is, no doubt, the case that the conditions prevailing on a high table-land of this kind, subject to prolonged drought, a fierce sun, great and quickly-succeeding changes of temperature, and dust-storms, have produced the characteristics of this family of plants without regard to the animals. Leaves are known under similar conditions to turn partially or entirely into thorns, and if these, in the nature of things, prove to be less edible to, and even a defence against, the existing fauna, that is an incidental advantage to the plant, as much so as the certain, though unrecorded, fact that the first Spanish donkey must have

found himself completely nonplussed by the first *Echinocactus* that he was rash enough to tackle.

But not all the members of the large cactus family live on arid lands. The huge candelabra cacti are often found in a jungle, whilst other kinds live in marshes, or at least, as, for instance, at San Mateo del Mar, in places where their roots stand in permanent moisture; others, again, as mentioned before, are climbers, and have even turned epiphytes. Still, the more arid the locality the more spiny are the plants, and many of those which climb are almost harmless, not because they live out of harm's reach, but because the atmospheric conditions that cause spinosity are absent; in these cases, therefore, the whole leaf is gone, and even its representative, the spine; and it almost amounts to an axiom that an organ once lost or materially degenerated cannot be re-developed.

Besides planting cacti as fences, man has found no further use for any of them, except that the fruit of some kinds is eaten, notably the "Indian figs," or "prickly pears" of the *Opuntia ficus indica*, the "nopal" of the natives. The fruit is called "tuna." There are yellow and red sorts, with a similarly-coloured flesh. They are daily brought to the market, and are deprived of the clusters of little prickles by rubbing. The proper way to enjoy their agreeably tasting pulp is to peel off the somewhat leathery skin, and to soak the fruit for some time in water, whereupon it acquires a surprising freshness. But after the enjoyment follows the inevitable regret, since, in spite of every care in manipulating them, some of the tiny prickles are sure to have got between one's fingers, where they cause an extremely irritating sensation.

In some districts the "tunas" form an important portion of the people's diet in the summer and autumn. A disagreeable, incidental effect of the blood-coloured pulp, mixed with the numerous indigestible seeds, is then to be seen in the lanes, at the roadsides, and other approaches of an Indian village, suggesting to the uninitiated observer a universal outburst of dysentery amongst the inhabitants.

* * * *

The track for many miles followed the valley of the river,

mostly dry and without any signs of cultivation, until this little tributary emerged upon the broader valley of the Totolapan, or Tehuantepec river. "How far was it still to Totolapan?" "Four leagues" (a dozen miles), was the crushing answer, but fortunately the Zapotec really meant to say a "fourth of a league," as within half-an-hour our goal was reached.

Here the land was under proper cultivation, with carefully irrigated fields and plantations of maize, sugar, plantains, and bananas. In the neighbourhood were several small silver mines. Fortunately, the village of Totolapan had nearly done with the small-pox, and things looked more cheerful in spite of a belated case here and there, these being aggravated by dysentery and fever. It was not healthy, and the people attributed this shortcoming to the unusually dry season and the fitful rains. On the day after our arrival the whole neighbourhood looked parched, but on the following morning the broad and flat valley, which had before been intersected with many water channels and sandbanks, was one expanse of turbid water which, before the day was over, had covered the ground with a chocolate-brown ooze, very fertile, though unhealthy. Negotiations with the natives were easy in this fairly well-built village; the Presidente even accompanied us on a little shooting tour, and boys and men showed themselves willing to collect, so that more than a dozen different kinds of amphibia and reptiles were brought together; but this small collection was sufficient to show that here in this valley, at the foot of the southern edge of the central plateau, most of the tropical creatures were dropping out, while some that were native to the north had descended; obviously this was the case with *Scaphiopus dugesi*, the spadefoot toad. The *Cnemidophorus* lizards proved of the greatest interest, and it was on this long ascent from the tropics to the plateau, having followed practically for the whole way the Tehuantepec river, that my eyes were opened to the changes of these lizards. The little, sharply-striped *C. deppei* still continued for some way further up the sandy stretches of the river bed, but its larger edition, the boldy-striped *C. immutabilis*, had been left behind in the "hot-lands"; then came a break, and now the

large *Cnemidophorus* was represented by the southernmost delegate of another species, *C. mexicanus*, which is striped only during its younger stages, and assumes later a cross-barred pattern, in conformity with the prevailing environmental conditions.*

On the other side of the river, to the south-west of the village, on the top of a hill, called " el Clarinero," stand the ruins of " el pueblo viejo," the old village, which is said to be full of antiquities. The very fact that the natives call it the old village indicates that they are of the same race, although these ruins show that these old houses were built of proper stones, whilst the recent houses have mud walls, are built of sun-dried bricks, and are tiled, except when they have only wattled reed-walls, with a high-pitched roof of straw. The doorstep of the principal shop was a large stone beautifully carved, and similar antique pieces were built into other houses. The village seemed full of antiquities, but they were difficult to see, and still more difficult to get hold of. We were lucky in getting a few stone adzes, earthenware tripods, and an idol; all of which were offered in grateful recognition for assistance of various kinds, after the people had heard from Mateo that " la señora blanca," liked such things. The man who brought the idol, a squatting mannikin, had indeed cause to be thankful, and before he showed me his treasure, was most particular to ascertain whether we were likely to sneer at it. He had it from his father's father's people; if filled with flowers on the owner's name-day it brought domestic bliss, and would we give it a position of honour in our home? This was gladly promised. A much finer idol was in the possession of another man who lived some distance off, and who sent word to us one night, but on the following morning he was already dead.

IDOL IN SHAPE OF A FLOWER VASE, FROM TOTOLAPAN.

* " A Contribution to the Study of Evolution based upon the Mexican species of *Cnemidophorus*." " Proc. Zool. Soc.," London, 1906, pp. 272-375.

Our friend, whom Mateo had assured that we were safe to speak to, opened out a little. Had he really derived much benefit from his saint, and was the latter still in full strength. considering that his crown was somewhat broken? "Yes, sir, you try him. He may be old, he is old, but that only shows he has the greater experience. But why do you ask? We are all Christianos, we are 'gente de razon.' Our padre also puts up little images in the church, and he puts vases with flowers in front of them, and he wants us to do the same in our houses, and to burn candles, and when he comes on his round he dresses up our boys and they burn copal. But, look you, when last he came back from Oaxaca he brought with him another image of La Virgen, in a dress of 'las tres garantias' (the national colours—green, white and red,), and with gold and stones, a costume which no woman wears. I ask you, what can she know about us? She knows nothing, and is without experience; 'es munieca!'—(it is a doll). Why must I put a doll on my shelf simply because it comes from Oaxaca, whilst I am forbidden to keep those figures which I have from my fathers?"

From San Mateo del Mar to this place, and again during the journey through Guerrero, we saw and heard many a thing which threw unexpected light upon the natives' religious state of mind. It may not happen everywhere, the people take good care of that, but such things as the following do happen. The church, even in an out-of-the-way place, looks and is well kept; there are beadles and churchwardens and a choir, and when the bells are rung for the "oracion," vesper or curfew, the people take off their hats and cross themselves; some go to Mass, and they besprinkle themselves with the holy water, and they do all that and more. It is well to be on the safe side; and one can never tell what it may be good for. But go inside, on a day in mid-week. On the altar stand the customary images, etc.; the Madonna in front of the cross, before her a gaudy vase with withered flowers. On either side she is supported by the clay figures of native gods, also supplied with flowers, but these are fresh, and are put into the crown of the idol, which in reality is often shaped so as to serve as a flower

vase. These "idols" disappear towards the end of the week, when the padre is expected; they are put underneath the altar, or behind it, into a niche, and if the ecclesiastic is a zealous fool he finds them and makes a fuss, and then he cannot even get a "niece" to cook his dinner. The worldly man states in his annual report that, thanks to the enlightened and vigorous action of the local authorities, in harmonious work with the clergy, and through divine help, the last traces of heathenish idolatry seem to have disappeared—at least, no case has come to his knowledge. Ultimately appears a well-written essay, by some very high prelate, on the religious state of the country, and everybody concerned about the natives' spiritual welfare is pleased; only the Governor wonders what has come over his faithful heathens.

In some States but few idolaters are left; in others they form the majority. The priests are nearly always white men, or at least half-bloods, but some are genuine "Indios," who, if they succeed in getting back to their native district, naturally make common cause with the natives. These Indians are emotional, in spite of their generally stolid behaviour; and they are therefore often enough ardent, even fanatic, Christians. In the large cathedrals of the principal towns one can witness little scenes like the following, which impressed itself upon our minds when we were at big, bustling Puebla. Two Indians came in; the son, apparently more accustomed to town-life than his old father, both in the typical poor man's dress of the country. Hundreds of Indians every day make their way into the town with one or two donkeys, loaded with wood or charcoal, the accessible supply of which recedes further and further away into the mountains. The father was one of these hewers of wood, in dirty, bespattered cotton trousers, one leg of which hung down, and the other was drawn up to the knee, barefooted, and with a large battered hat that he held in both hands; he walked noiselessly, as if fearing to tread, with the most reverent and awestruck look. Our Mateo was a man of a different stamp; before arriving at Puebla I asked him about the churches and other buildings, knowing that he had been there when a youth. But he said: "Sir, I came here

as a poor boy in charge of somebody else's donkeys, to make a living, but not to visit temples."

Frequently these same people cling firmly to their ancient rites. In the State of Oaxaca there is probably in every district, if not near every village, some secluded spot—be it

TYPICAL HOUSE OF THE ZAPOTECA SERRANO.

a cave, the top of a mountain, or a pool—whither the people clandestinely repair in order to make sacrifice, especially at the time of a new moon. This is propitious, owing to its waxing, for the obtaining of an increase of family, cattle, or crops. The favourite sacrifice is a fowl, or a turkey, whose head is cut off and buried, while the soil and other offerings, consisting of dishes with food, or tortillas, and a small gourd with some

intoxicating drink, are besprinkled with the blood. The tortillas are pierced in three places with the spike of an agave leaf. Very often the heads of chickens, or the bones of dogs, are buried outside, against the very walls of the church. This is really a sign of the advance of Christianity. The devotee has forsaken his own secret place of worship for the church, inside which he, of course, cannot perform these rites. In other cases it depends upon the place where he makes these sacrifices for them to have the desired effect. For instance, if he bears a grudge against a neighbour he buries these things at night outside his intended victim's house; though, on the other hand, when the ceremony is performed within the hut, it is meant to bring good luck. In many districts, as, for instance, near Tehuantepec, the hunter cuts off the head of the stag and buries it, after having offered it some water; in others, as at San Bartólo, he has no such scruples.

Every child, at birth, becomes intimately connected with some animal, and the two souls or spirits are henceforth joined together, and the grown-up man will never hurt that particular kind of creature. If the animal dies, the child dies. Naturally, the father is anxious to find out what kind of animal will be the spirit associated with his child, and in order to do this he strews ashes or dust upon the ground outside the house at the time of birth and watches for a spoor. The dead are given various things to help them along on their journey into the unknown. Sweet cakes, or mince-meat cakes, wrapped in the leaves of the corncobs, a little gourd with something drinkable, some coins, or tortillas, to throw to dangerous dogs are given, and—oh, vanity, thy name is woman—in the case of a lady she is provided with the large, smooth-shelled seeds of the mamey fruit, with which to make her hair smooth and glossy, these seeds being otherwise much used for smoothing cloth in the factories.

We left Totolapan after a rainy night, which brought a plague of mosquitoes and smaller pests, with a bad mare, a weak-kneed mule, and six donkeys, slowly following the dry bed of the river, the valley of which widens out often to four hundred or five hundred yards, and which in many places is

absolutely dry, so that the water must find its way below the surface. There we overtook a man and three women, son, mother, wife, and sister, who could scarcely crawl along, being well-nigh starved, these poor creatures having come from Tehuantepec in the hope of getting employment at Oaxaca. The man carried the little child. Their gratitude for a few coins was touching, but they did not beg, and, for that matter, we have never met a beggar in the State of Oaxaca, excepting at some railway stations where the blind and lame collect,

THE STARVING FAMILY.

and children are being gradually demoralised by having coins thrown to them by well-meaning, but mistaken, tourists. "How have you got along from the coast without money?" "If the people see that we do not want to stay, they give us shelter, and allow us to grind their corn, and we then share the tortillas."

Further on we met a very different group, some cheerful pedlars coming down from Oaxaca, with children's toys, and they were not averse to a little trading and a chat. Were we Americans? "No, from Inglaterra." "Is that a big town?" "No, it is a country on the other side of the

water." "Father," said the boy, "they mean their country, by Intla-tierra." Then followed a long talk about that mysterious land. How far was it? A question which was often asked, and could never be answered satisfactorily to people who did not know the sea, and whose idea of a ship was a dug-out. On some such occasion the statement that the voyage across the water took about a whole week fell very flat,

PEDLARS.

since they at once calculated the distance as six long days' punting with nightly rests between. "If your country lies near the big water it must be 'tierra caliente,' and you have plenty of plantains, pineapples, rice, maize, and sugar?" "No, it is a 'tierra fria,' and that produces none of these things." "But surely you have maize?" "None, only wheat and potatoes?" "What do you make your tortillas of?" "Eat only wheaten bread, which lies so cold on the stomach?"

"What, then, do you live on?" "We eat wheat, potatoes, and plenty of cattle, and the big water is full of fish, and the rest we buy from other tribes; our great 'canoas' are always coming and going all over the world to fetch food." "Where do you get 'la plata'?"—the silver or money. "Have you many mines, and do you find much gold?" "We have neither, but very much iron, and we make anything that can be made out of iron. The whole railway at Oaxaca was made in Inglaterra, and we buy your cotton and your 'ixtle'-fibre and your hides, and when we have made them into cloth, ropes, and leather, we take them back to sell them again in your big towns." "Methinks, my friend, that your country cannot be very rich. What are *you* taking up to Oaxaca, your pack-train is carrying a tidy load?" "Oh, we have nothing to sell; I am a schoolmaster, and we are catching animals and collecting plants, and making pictures, to tell our people at home what your country is like." "And do they pay you for that?" "I wish they did!" One thing was quite beyond the understanding of these good people, namely, that during our cool season the water becomes so hard that people can walk over it. They did know ice in the shops of Oaxaca, funny stuff which was quarried by the Americanos, but it was no good, since it burnt your fingers and turned into water whilst you were looking at it. And to explain snow in a snowless land, with none of the high mountains within sight, would be as profitable as talking to a Midland yokel about liquefied air.

The road continues to follow the river to about 1,300 feet above Totolapan, the slopes growing low forest, but without any oaks or pines; cactus and leguminaceous shrubs form the chief vegetation. Yet in one of the "barrancas" our attention was attracted by the loud screams of macaws, which, to our surprise, proved to be the green *Ara militaris*, which we saw here for the first time, instead of the red and blue *A. macao*. Then followed a steep ascent until the edge of the great plateau was reached, about 5,000 feet above the level of the sea. The view back, towards the south, was a wonderful mountain panorama, enabling one to mark the course of the river into the lowlands in broiling sunshine, enhanced by a black-blue thunder-

storm far to the south-west. Although in reality but sparsely timbered, the hill-tops combined to give the impression of a densely-wooded country. Before us, northwards, a plain extended right up to the horizon, except where modified by low, gently sloping hills. Here were no more of the senile columnar cactus, but opuntias and globular cactus—*e.g.*, *Mamillaria* and *Echinocactus ingens*—in endless varieties and sizes, from a shilling to a cart-wheel, some ribbed, some smooth, with innocent-looking hairs and others with vicious-looking hooks and claws, some indeed almost all claws, with scarcely a stem to protect. Here, too, were mimosas, different to those lower down, red blooming sage, thyme-like little shrubs, a yellow blooming *Apocynum*, looking like a young eucalyptus tree with its dull bluish leaves, white blooming ipomoea trees, and here and there green meadows and fields of Indian corn. The air was heavenly, most fresh and crisp, in spite of the biting sun. What a joy, at last, to be out of the sweltering tropics, with their insect pests, their diseases, and their restless nights, where for months a full breath of pure air and a cool drink of natural water had become mere ideas representing the height of bliss. And yet how we wished ourselves back in the tropics, when, within a fortnight, after a little railway mishap on the plateau of Puebla, a drizzling cold rain and cutting wind brought on the homeliest of colds; how we yearned for them again for a year and a half, until, with indescribable joy, we once more saw the promised land, this time the tierra caliente of Guerrero, with all its exuberant glory, the abundance of life and therefore also of death, the struggle for existence in all its most vigorous phases, with its endless miraculous results. What are the most soul-expanding places, the real "openers of the eye," which teach us most and make us feel most small? A mountain reaching into the eternal snow, a desert, and a tropical forest, is the reply; these three, and the forest is the most wonderful of all. However, they all have their drawbacks, and after some time it is always a case of "Da wo Du nicht bist, da ist das Glueck."

This southern edge of the great plateau of Mexico is one of the important world-boundaries affecting the distribution

of animals and plants. It is here that the North American and South American floras and faunas meet, or rather, where they first met, with the resulting mutual penetration, both peaceful and warlike. The edge of the plateau, at least at this spot, happens to be further emphasized by the fact of its gently sloping down towards the north into the valley of Oaxaca, so that the little streams arise almost at the edge. The whole plain, or " valley," looks like the bottom of a fresh-water lake, with sandy depressions, and here and there flat-topped fields of lava or finely triturated rubble, which contains much salitrous matter, partly covering the ground with a thin, whitish crust, and imparting to the soil and water a perceptible, though not disagreeable, mineral taste. This same taste, too, if translated into terms of smell, seems to pervade the whole atmosphere, especially after a slight shower. It may be accidental, or, on the other hand, it may be a direct cause, but it is in any case a fact that this sensation is considerably enhanced by the ipomoea tree (*Ipomœa arborescens*), which is characteristic of such comminuted volcanic soil. Its white flowers, with a maroon centre, have a sweet, pungent smell, the concentrated essence of the prevailing local scent.

We camped some distance north of San Dionisio, the first village. The houses stand each in the middle of a yard, which is invariably fenced in with a palisade of *Cereus*, each plant growing as if carefully trimmed, and forming a single upright pole ; most of them have clusters of tiny spines, while others have none at all. The rivulet near the camp had cut its course deep into the soil, forming little pools, inviting places to bathe in. In one of them we gave our boas a swim, and wanted to give the same treat to the tortoises. As a preliminary, one was turned loose, and promptly disappeared beneath a boulder, Mateo having to dive for it. After some groping about we found it and another as well, the only tortoise which we had seen since we left the coast ! A long search up and down the stream did not produce any more.

The Dionisians were busy with preparations for the National Independence Day ; they had killed a number of deer, of which they sent us some most welcome venison, and

all throughout the night the strains of the national hymn, and those of their own Zapoteca dance were wafted across the plain, over and over again, always with the same hitch, until we knew the thing by heart, faults and all, and fell into a trance, and finally asleep.

The temperature at sunrise, which was down to 15 C. (59° F.), drew the whole party round the camp fire, and then followed a monotonous ride of six hours over a regular cart-road fringed with hedges or clumps of shrubs and trees, the refuge of thousands of *Sceloporus* and *Cnemidophorus* lizards. A few pigeons and crows, grackles, and some "zopilotes," or black-faced vultures, were seen in the village. The red-faced "aura" had left us above Totolapan; on the plateau this North American species of turkey buzzard is rare, and the "zopilote," also is far from common. One sight was pleasant enough, that of an eagle perched upon a cactus growing on stony ground, forming the emblem that appears on the Mexican coat-of-arms, only, instead of a snake, he was dissecting a lizard.

CHAPTER XII.

ZAPOTECS AND MISTECS.

The National Fête Day at Tlacolula—The Plume Dance—President Diaz, an appreciation—The Temple Palaces of Mitla—The Ruins on Monte Alban—Many Tribes and Languages—The Capital of Oaxaca—Progressive Natives—A State Dinner—Misteca Poetry—The Mountain of San Felipe.

Tlacolula is a town, well-built and clean ; its 6,000 inhabitants are mostly Zapoteca, and they call it " Guichibaa," which is said to mean " glorious place." The Aztec " Tlacolula " has been rendered as " small place," or " place of twisted things." There is a fine church, with many solid silver ornaments, but more interesting were the numerous oil and water-colour pictures by native artists, hung on the walls, votive offerings perpetuating the miracles wrought by the saints and the Virgin Mary. Some of them were exceedingly realistic. A drowning scene in a spate, a woman and baby floating on top of a straw-thatched roof, and being rescued by means of the branches of a tree ; runaway horses jumping over a prostrate child ; murder, fire, cattle stampeded by a jaguar, etc., and in some of the scenes the directing spirit of the rescue is indicated by a hand or face peeping out of the clouds.

The Prefect, Sr. Andrés Ruiz, an exceedingly courteous gentleman, was an antiquarian who took great interest in the customs of the Zapoteca, and he had brought together a lovely collection of old earthenware objects. He had much to say about his treasures, and was worth listening to, since he intimately knew the language and customs of his people, who in turn trusted and liked him.

Tlacolula was *en fête* to celebrate the 16th of September, the day of the declaration of Mexico's independence of Spain. Moreover, the 15th is the birthday, or name-day, of President Diaz, and although the large town of Oaxaca, the place where he was born, no doubt afforded a grander spectacle, we chose to witness a humbler, but much more genuine, display, and it was our good luck to witness some unforgetable scenes. The little town and its large square were decorated with garlands and flags like a fair. From early morn there began to come in from far and near the " presidentes " and " alcaldes " of the native villages, all of them genuine Zapoteca, some of them chiefs. Each with his wand of office went up to the Prefect to report himself and to kiss hands. Thousands of these people came in, every one of them spotlessly clean in their white, buttoned cotton shirts, which are either tucked into the narrow-cut cotton trousers, with a coloured sash, or worn loose; sandals, straw hat, and " machete " sheathed in a leather scabbard. A review was held of the young men, splendid fellows, tall, well-built, but rather narrow in the hips; they all flashed their bright swords in giving the salute. The Zapoteca have refined features, a strong, well-shaped, aquiline nose, a narrow, high-checked face, and a long, slightly-curled imperial moustache. Three at first, and soon four, different brass bands were playing the Mexican national and Zapoteca hymns, all at the same time, although by no means in unison, so that the noise was great, and there were many other things going on. Some of the villagers had brought their wooden masks, representing animals with human faces, a jackal, a jaguar, a stag, etc., and made processions through the streets in groups, then performing a weird dance. Others crowded into the church, the bell peals of which added to the din. The market, loaded with fruit, cooked eatables, and beautiful blankets, was thronged, and so, of course, were the drink-shops. But in spite of these thousands of men, women, and children, many of them not knowing a word of Spanish, there was not the slightest disorder. Some of the chiefs became a little unsteady, but their young men led them gently out of the crowd. The greatest preparations were going on at the

municipal buildings, where all the dignitaries of the town and the villages, with the chiefs, collected, and where there were a dozen tall men dressed for the "danza de la pluma." When these men were being reviewed in the pretty, shady garden, there was no standing-room left, and even the trees were covered with

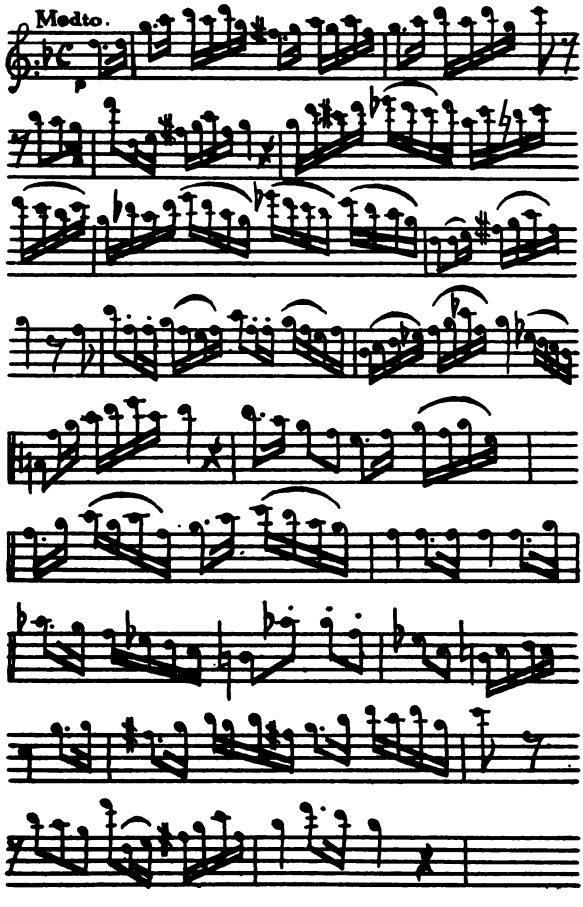
ZAPOTECA PARADING FOR THE PLUME DANCE.

spectators. This dance is an old Zapotec custom, and is intended to record the main facts of the conquest. The performers are dressed in what is probably a representation of their ancient priests' festive costumes. Their helmet is of plaited leather, with a chin-strap, and a huge ornament of feathers of eagles and turkeys, some of which are dyed purple. The dress is made of leather and silk, with fringes, tassels, and braids of gold, and they wear an apron of leather similarly

ZAPOTECA PLUME DANCER.

(From "Reseña histórica del Estado de Oaxaca." Lic. Franc. Belmar. Oaxaca, 1901.)

braided, and with embroidered designs. Their long trousers have three tiers of gold fringes. Yellow shoes complete their very pretty outfit, and in their hands they carry a little rattle.



MUSICA DE LA DANZA DE PLUMA.
(From Belmar.)

The dance takes place after mass, in front of the church, but within its grounds, and lasts at least three hours.

In the night another function took place which throws light upon the degree of culture reached by the Zapoteca. A shed,

with a kind of stage, had been prepared, the Prefect took the chair, and after a few formal and patriotic speeches, the children, boys and girls, white and brown, recited poetry, the theme being the share which the State of Oaxaca had taken in the national development of the Republic. Be it remembered that Benito Juarez was a full-blooded Zapoteca, and that Porfirio Diaz is a native of Oaxaca, with a strong admixture of Misteca blood, and that both started life as poor boys without knowing a word of Spanish. It was touching to hear one of the brown girls in her recitation speak of the "pallido Frances," whom her father had helped to drive out of the land. Outside the shed thronged the natives, craning their necks and trying to get a glimpse of the performance; behind them were the women, squatting around charcoal fires, roasting and frying, while street-sellers walked about and offered in whispers their stock of food. The large square looked like a camp. Poles had been planted in the ground, supporting pairs of crossed cane rods upon which mats had been put, to give shade during the day, and now at night they served as shelter from the cool, clear sky. They were all waiting for the "Grito," the shout which is raised at night by the chief official, accompanied by the peal of the church bells. "Viva Mexico," "Viva la independencia," went off all right, although they were too official to be taken up generally, but "Viva el Presidente, nuestro 'tata,'" "Que vive muchos años," were responded to with as much of a roar as these undemonstrative natives are capable of. They had come to do honour to "their" President and their "father," whom these people simply adore.

I here take the opportunity of saying something about this truly great man, who, in his combination of soldier, ruler, and political economist, does not easily find his equal. It would be preposterous here to allude to and to praise what he has done for Mexico, but I can mention a few points which it has been my privilege to observe on the occasion of the four audiences with which he has honoured me. Having furnished me with special letters to the governors of the various States, he asked me to report on the completion of my first journey,

and to make it easier for me he dismissed his *aide-de-camp*. Being still full of the scenes witnessed at Tlacolula, I described them, and how the people spoke of "their President," their general, their "tata," how they had mustered in force, armed with their "machetes," and willing to do his bidding again. Tears came into the eyes of that man of iron; wiping one away with a short, jerky gesture characteristic of him, he said: "You know, of course, that they are not the men I led; they are their children and their grandchildren. When, at the time of the French intervention, I went to them, to my native State, I had scarcely any arms and no money, yet they came willingly, and followed me right up to the capital." Had I noticed the schools? Truthfully I could declare that we had visited every school along our track, from San Mateo del Mar to Oaxaca itself, and how, even in remote places, the Zapoteca masters taught the boys successfully to write an astonishingly good hand; how the boys did their sums, and learned the political geography of their country out of sensibly-written books. But I could tell him more. How, between Mitla and Oaxaca, we had seen several grown-up men, who had bought spelling-books, sitting by the roadside, anxious to see what it would be like to master their contents. Then he spoke of the Huavi, the superstition of the people of San Bartólo, and wound up with a description of his visit to the old Zapoteca fortress of Quiengola, near Tehuantepec. The President knows his country better than any other man; during his long and adventurous life he has visited, mostly as a soldier, nearly every State, and he takes an interest in everything, applying to all things alike a marvellous power of observation. After our return from Guerrero he talked freely about its natural history; for instance, he first described the comparatively harmless nature of the rattlesnakes, and then, to the astonishment of a general who was present, he described the vicious "rabo de hueso," the "fer de lance" of Corboba, explaining that the bony appearance of its tail was really caused by peculiarly-coloured little scales. The circumstances, under which he made his observations, were described with fascinatting, realistic touches. "Geckos? Oh, yes, I know their ways

and how they feed; while I happened to be lying wounded I watched them for many a day hunting for flies on the walls and rafters of the hut. As to scorpions, the effect of the sting inflicted by them is much exaggerated, and people get over it within four to six hours; but there is one kind, in the hot country of Jalisco, which is small and almost transparent, and this is really dangerous. I happen to know this from experience. When I was camping with a squad of soldiers near Tepic, I warned the men to be careful, but five were stung overnight, and two of them died; maybe they were not in good condition." The fiasco about the "animal planta" I have related elsewhere, in Chapter XIV. Then he gave a succinct, but perfectly clear, account of the theory of malarial and yellow-fever infection through mosquitoes, with references to the working of a commission at Vera Cruz.

Audiences are given on certain afternoons in the palace, unless one is honoured by an invitation to the tastefully furnished private residence. The company in the ante-chamber is a wonderful sight. First, there are men, mostly foreigners, who want some concession; officers with their private affairs; chiefs who come to report some trouble to "their father"; Misteca and Zapoteca women, who come from afar, and to whom he speaks in their own language; a crowd of all ranks, and of many nations.

Within eight miles to the east of Tlacolula are the ruins of Mitla, one of the greatest and most beautiful sights in the whole of Mexico. A good country road leads to them from Oaxaca, a drive of thirty-one miles. The drive is through open country, which appears still more barren and desolate as we approach the ranges of the hills, which are covered with stones and boulders, volcanic, brown, bare, and dry. An exceedingly good inn is kept in the village by Sr. Felix Quero; it is well-named "The Surprise"; has a garden-like "patio," clean, shady rooms, good cooking and service. The village itself is a wretched settlement.

From it two parallel roads lead across a little stream straight to the ruins. Mitla, contracted from "Mictlan," is an Aztec name, meaning "death-place"; the Zapoteca call

the village "Yu-baa," and the ruins "Lio-baa," meaning "place of delight, or rest." The general plan of the ruins, which stand on flat, rising ground, is this: In the middle of a wide place stands a small pyramid of stone, mortar, and earth, and ascended by a flight of stairs on the east side. It is now surmounted by a cross. There are four principal ruins of palaces: one to the north, a second to the east, facing the stairs of the pyramid, a third and a fourth facing the south-east and south-west corners of the square (which is open to the west), and at some distance southwards, on the village side of the stream, stands a mound and a pyramid. The palaces, which are magnificent in their dimensions and their purity of design, are of marvellous beauty. Each may be described as a square, with the sides true to the cardinal points, entirely built of carefully-hewn stone, and averaging, perhaps, fifteen feet in height. The front is taken up almost entirely by a flight of stairs, with three doors near the top. The three other walls have neither windows nor doors, so that the four walls really enclose a court divided into many large and small chambers, all opening into the court. That they were roofed in, is certain. In one of the halls stands a row of monoliths, round, polished pillars, nearly twelve feet high, into the tops of which mortises had been cut to receive the beams of the ceiling. The most beautiful chambers are those of the east court. The walls of each have a separate "Grecque" pattern, which is either cut out of the stone or of small stones mortared in. The groundwork, of which traces are still extant, was painted red. In the walls are also niches. No arches are to be seen, but everywhere straight, rectangular lines; enormous blocks of stone, a yard thick and several yards long, form the lintels over the doors, and many parts of the outside walls also show a Grecque pattern.

The largest palace was that on the north, standing on the higher ground; it is practically ruined by the church of San Pablo, which has been built right into it, and most of the once beautiful court has been turned into the "curato," with stables for horses, cattle, and pigs, though the priest himself does not live there. Much of the material for these vandalic

buildings has been taken from the various palaces. They were, after all, the same bigoted fanatics who, much about the same time, built a church right into the Mosque of Cordoba. Those dirty stables were a heartrending sight; along the walls runs a frieze of hard, polished stucco, coloured dark red, and upon it were painted in white some hundreds of figures representing gods, people, snakes, birds, flowers, and trees, most minutely and carefully executed. Many of these frescoes have been ruthlessly destroyed, and are now breaking away; the same applies to those which have survived over the doors on the inside of the other courts. These paintings cannot be saved, the mischief has been done, but lately, within the last few years, Government has taken the rest under protection; a caretaker prevents pilfering and disfigurement, and the Federal Government inspector, or conservator of Mexican antiquities, has to some considerable extent restored many of the blocks to their proper position on the palaces. There are also, for instance, near the south-east court, subterranean crypts built in the shape of a cross. A narrow entrance, flush with the ground, faced by large stone slabs, leads into a low passage which then widens into three chambers, the ceiling of which can just be touched, the walls being ornamented with the usual Grecque patterns. Much fuss has been made about these crosses, and others in Yucatan, and fanatics have seen in them evidence of pre-Columbian Christian influence. It is nothing of the kind. The entrance-passage runs from west to east, and the other arms point, consequently, to the north, east, and south, the cardinal points. Humboldt tried to dispose of the Christian ascription of the American prehistoric crosses by the erroneous statement that they have only three arms, the top extension being wanting. Similar underground cruciform crypts have been found in the mountains further east, and more no doubt will be discovered at Mitla itself, if ever the accumulated *débris* and soil from the whole of the wide space should be removed. The neighbourhood is full of mounds and similar remains.

Who were the people who constructed all these marvellous buildings: these glorified palaces, and mausoleums of kings

and high priests? Nobody knows. They were already deserted, although not spoilt by vandalism, when the Spaniards discovered them. It was then, as now, the land of the Zapoteca, and one of the later Aztec kings is known to have conquered them to a certain extent, when he forced his way into the Isthmus of Tehuantepec. History and tradition are mute about Mitla, the natives of which, now about as low as civilised natives can be, are quite indifferent about the ruins, and have eagerly taken to their modern substitute. They being of a religious turn of mind, the Spaniards found them willing disciples, and here, as elsewhere, they imported the Inquisition; and, with the torturing and burning of heretics come in its train, they provided that excitement which hitherto had been derived from human sacrifices.

The difficulty of assigning these ruins to the Zapoteca, or to the fabulous Tolteca, lies in the fact that these palaces are so very different in structure and design from anything else in Mexico, except, perhaps, from the temples of Yucatan; they contain hardly any carved figures such as are found, for instance, on the Pyramid of Xochicalco, nor are they big mounds like those of Teotihuacan and Cholula. Scarcely anything has been found in the crypts, except a few bones and some little clay figures. The whole place seems to have been carefully cleared of all its numerous contents by the rightful owners, when these had to leave the country, and in this respect we are reminded of exactly the same conditions at Teotihuacan. Yet the clay or stone figures found in the land of the Zapoteca are characterised by an elaborate head-dress, in design much resembling that still used by the performers of the "plume-dance," which has its unmistakable natural prototype in the "Rey Papa Mosga," a little flycatcher (*Muscivora mexicana*). This bird inhabits Central America, but extends northwards into the tierra caliente of Mexico, preferring thickly-wooded localities in the neighbourhood of a stream. A few other species, all rather rare, live in northern South America. The bird itself is dull brown and buff, but its glory is its crest which, when erected, forms a scarlet halo, each feather being tipped with black and metallic purple;

and the shorter feathers so arranged as to form a narrower crescent of black dots across the red disc. The female's head-dress is smaller, and orange to yellow, instead of red. When at rest, this " huipil "—one cannot help thinking of the resemblance to the Tehuantepec belles—is folded back, and rests upon the neck ; but these diminutive beauties are always excitedly opening and shutting what no doubt they glory in possessing.

To the south-west of Oaxaca, within a few miles of the town, is the Monte Alban, on the plateau-like top of which stand the ruins of what must have been a large and fortified town, to judge from the many earthworks, walls and mounds scattered widely over the slopes, and the undulating ground near the plateau, on which have recently been unearthed (and cleared of *débris*) many great terraced palaces, pyramid-like structures, subterranean passages, and crypts. There are so many, and the place is so large that a short description would be futile. Standing on the top of one of the quadrangular terraced esplanades we could only gaze and wonder at the rest. The sides of the passages leading to one of the crypts are lined with stone slabs on which are carved in relief several men about four feet high ; but these men have Mongolian features, and, what is more wonderful, one of them has a long pigtail hanging down his back. It is so unmistakable a queue that one of the natives pointing to it, said, " Look at the Chinaman ! " It is ridiculous to call these figures " monkeys with the tail turned up " (and growing from the head) in order to do away with anything which might possibly bear some testimony as to the oriental origin of this civilisation. I say " might possibly," since the whole of that question has never been tackled in earnest, although certain shallow (and therefore all the more assertive) hypotheses have been launched, only to be brushed away by equally weak and scornful objections. In contrast with Mitla, on Monte Alban have been found countless figures of terra cotta, or carved out of stone, with idols, implements, pottery and ornaments cut out of obsidian, or made of gold, some of great beauty and in perfect condition. Cartloads of broken bits might be carried away

by anyone who likes to run the risk of evading the guardians. Here, on this side, we are in the land of Misteca, closely allied to the Zapoteca. "Mixtl" in Aztec means a "cloud"; it is the "cloud-land," the mountainous western half of the State of Oaxaca, which the natives themselves call "ñu dravui," "land of rain."

It is interesting to note the differences in the facial features of the clay figures of Monte Alban. They agree as much with those of the present Misteca as do those further east and south with the present Zapoteca, so that these two large tribes with certainty seem to have inhabited, and worshipped at, these buildings, though it does not necessarily follow that they constructed either Monte Alban or Mitla.

Sr. Don Francisco Belmar, then Secretary of State at Oaxaca, now judge of the Supreme Court in Mexico, has given the following approximate census of the many tribes which inhabit the State of Oaxaca :—

White and Mestizos	320,000
Zapoteca	284,000
Misteca	205,000
Mazateca	37,000
Mixe, or Ayook	32,000
Chinanteca	18,000
Cuicateca	14,000
Chatina	13,000
Chontales	10,000
Mexicanos	4,600
Huavi	3,500
Chochos, or Popolocos	2,600
Triques	2,200
Amusgos	2,000
Zoque..	2,000
About ..	1,000,000

It may here be mentioned that the Mexican Republic does not yet possess the machinery necessary for making anything like an accurate census of its population; and the numbers of the less civilised natives especially are mere guesswork,

let alone those of the still really wild tribes. The Prefect sends in the return for his district, himself relying upon the returns of the municipal presidents, who certainly do not over-

MIXE TRAMPS.

estimate their people, many of whom live in lonely hamlets, scattered among the mountain fastnesses. The census of the towns is just as difficult. The Indians shrewdly suspect that

a census may be connected with increased taxation, with military service, vaccination, and similar blessings of civilisation, and those who feel that they are "wanted" think that this is a dodge for catching them. Consequently, there is an exodus, and they vanish. Those authorities who know the prevailing conditions, consider the population of brown natives to be several millions larger than the official returns. It is also absolutely impossible to distinguish between white and people of mixed blood, since every degree from pure white to "Indios legitimos," or genuine natives, is amply represented. Their names and surnames do not give the slightest clue to descent, these being almost invariably Spanish, never translations of aboriginal names; in fact, the latter are now extremely scarce, as, for instance, that of "Mexia," the name of one of the Aztec generals who was shot, together with the Emperor Maximilian. Owing to this mixture of races, there exists no racial question in Mexico, which in this respect is an ideal country. A full-blooded Indian can attain to the highest position in the land, witness Juarez, the Zapoteca. Soldiers, lawyers, judges of the High Court, savants, have been and are Indians, the majority of them Zapoteca or Misteca, and it appears that the pure native who rises to a high position, is a better man than the half-caste, while, again, a small admixture of Indian blood is of great advantage. If the total population of the Republic be taken at thirteen millions, about two and a half millions are white, six and a half millions of mixed blood, and the rest, at least four millions, are pure "Indios"; and if the total should, as some authorities suspect, amount to near fifteen millions, the additional numbers would be due to the "Indios." In any case, the "brown blood" predominates, and there is no sign of its being swamped by the white. Few of the many Indian tribes have shown any sign of decreasing within the last century. Those who live in the wild, still uncivilised parts, live on as before, or rather better, since intertribal wars have long since come to an end. As a rule, the natives increase but very slowly; they are prolific enough, but the infant mortality is very great, owing to the almost incredible carelessness of the parents. In the hot countries,

for instance, each married couple—and they mostly all marry —averages from five to six children, but infant mortality

ZAPOTECA CAGE SELLER.

varies from 30 to 66 per cent., with a usual average of 50 per cent.

How very capable the Misteca and Zapoteca are of progress we had some opportunity of seeing during a week's stay in

their capital. Its name, pronounced Oahakka, is a corruption of the Aztec Huaxyacac, which refers to a kind of fruit-tree, the "huaje," and nearly every tribe has its own name for the town, quite different in sound, but always alluding to this tree. The Misteca themselves have a tradition that they are descended from the trunks of trees. This tradition is still vigorous, and tree-worship is still actually practised, although, of course, in secret. In the museum of the town is preserved the branch of a tree which grew in the neighbourhood, and was cut down by the authorities because the natives went there to worship it, on account of its bearing a resemblance to a quaintly distorted human figure. The town was already in existence at the time of the conquest, and was soon garrisoned by one of Cortez' lieutenants as a southern outpost, and called Segura de la Frontera. Situated in a large and very fertile plain, at an altitude of 5,000 feet, with a delightful and healthy climate, it soon became a prosperous settlement. The whole district and much more besides, comprising many towns and villages, was given by the Emperor Charles to Cortez, together with the title of Marquez del Valle de Oaxaca, and thenceforth he was known as El Marquez del Valle, or simply El Marquez.

The town has about 40,000 inhabitants; the views across the plain, bordered on the west by the mountains, is not particularly grand, but the town itself is well-built, and contains many beautiful churches, well-kept gardens, broad avenues, and a most interesting square, flanked by colonnades and the Governmental palace. Every evening a native band played on the stand in front of the palace, and the garden, the seats, and the walks under the trees, were crowded. They played beautifully though, and, as a brown native lady said: "What else can you expect in a town where nearly everybody is musical, and can play some instrument?" There were ladies and gentlemen in smart European dress, and amongst them hundreds of bare-footed natives, the women with a dark, mostly blue, "rebozo" (a sort of mantilla) over their head and shoulders, and the men wrapped in "zarapes" of many colours and patterns, and with the usual sombrero. Again, there was no

noise, or quarrelling, but everybody was on his or her best behaviour, and if anything happened the native policemen, in their smart dark tunics and sandals, armed with machete and revolver, unobtrusively put things right. The people of the State of Oaxaca pride themselves on having no Federal police; they won't tolerate them, because they feel perfectly capable of looking after the public safety themselves. Troops are, however, stationed at Oaxaca, and at Juchitan, on the Isthmus, in consideration of the political importance of this State.

The Governor, Sr. Don Bolaños Cacho, now a barrister of renown in Mexico City, paid us every attention he could possibly think of. Under his personal guidance we thoroughly saw the town. It contains an institute of science and art, a kind of university, comprising, besides others, a medical faculty, a fine library, and a museum in which priceless local antiquities, among them some of the actual moulds used in prehistoric times for the making of clay masks. Amongst the animals may be mentioned a specimen of a "Gila monster" (*Heloderma horridum*), a perfect giant of its kind, about two and a half feet in length. But by far the most important and interesting subjects to us were the normal schools for male and female teachers. That for the women teachers has grown out of the "Academia de Niñas," *i.e.*, girls' academy, founded by President Diaz, who thus emphasized his opinion of the value of education. The "Escuela Normal para Profesores" contains the room in which no less a man than the President, General Diaz, himself was born, or rather, let us say that the school, quite a new building, stands at the place of that historic house, and upon one of the class-rooms has been bestowed the special honour of having been the chamber of birth. Lecturing was in full swing, everyone of the teachers was a native, and the classes consisted of native boys, these future professors or teachers being attired in spotlessly clean white shirts and pantaloons, with bare feet. In the chemistry class the master had written a long formula for some compound, say sulphuric acid, on the blackboard, which these brown, intelligent-looking boys took turns in reducing. For

several days after I was taken to task by people who wanted to know whether it was true that the boys "had correctly developed sulphuric acid." Not that the enquirers knew anything about the process themselves, but that they felt justly proud of the achievement. The other classes were on a par with this one, geography was splendid, hand-writing like copper-plate, and the answers to complicated mental arithmetical questions were given like a flash. These young budding professors are now sent out to almost every out-of-the-way village to teach Spanish and the three "R's," and the better and more widely taught they are themselves, the better will they be able to accomplish their often enormously difficult task. There is no fear that the Huavi boys at the far-off lagoons on the Pacific coast will learn how to "develop sulphuric acid," nor will they be taught English in a hurry, although their "maestros" are now obliged to learn both subjects at the Normal Schools. But the brighter boy does not stop at that, he finds his way into the "Instituto," or to Mexico City.

The director, or headmaster, of this school, who was a full-blooded Misteca (Sr. Abraham Castellanos), got dispensation from his duties to act as our cicerone during the whole time of our stay in the town. As he himself was interested in natural history, and, above all, was a keen investigator of his nation's past, besides being the author of several pedagogic works, it was delightful and instructive to make excursions with him and his graceful sister.

A great dinner was given in our honour, but thoroughly enjoyable as it was, it was also very embarrassing. Our "society" clothes had been left behind in Mexico, and our wardrobe, which showed considerable wear and tear, was not exactly the thing for a State function at which to meet the Governor and his brother, the Secretary of State, the director of the institute, the director of the school, several consuls, and the ladies of those gentlemen. My personal trouble began with the hat; every Mexican of tact treats the hat of his guest with the greatest respect; at a visit it is given a chair to itself; it is thought to be as sacred and entitled to as much personal consideration as is the sword of a German officer. In the

ante-room of the palace the guests were met by orderlies, the captain of the Municipal Guard, in full uniform, who received the shiny Parisian top-hats and deposited them upon velvet cushions, the same treatment being accorded to my apology for a sombrero. Stout laced boots, which had once been yellow, walked in company with patent leathers. However, the assembly, representatives of the best society, had not come to inspect our garments, and the conversation during the long

ABRAHAM CASTELLANOS.

and choice dinner was as animated as it was interesting. It was polyglot; you could speak, or at least listen to Spanish, English, German, French, Norwegian, Misteca, and Zapoteca, whilst Sr. Belmar, the linguist, had half-a-dozen other native idioms up his sleeve. Even Latin was attempted as a joke, but rightly voted to be not a patch upon Spanish, which was, after all, the general medium for conversation. This dinner made us free of the place, and there is much good society in the town, which is interested in literature and art as well as

commerce. Sr. Castellanos has since been transferred to Mexico, where also we had the pleasure of seeing much of him. As a Misteca, who speaks his native dialect, he is more fit to pursue his hobby of collecting the traditions and songs of his ancient race than is the professional foreign savant, whose knowledge can never hope to understand the genius, the real soul of these idioms, so fundamentally different in thought from anything we are accustomed to. With his permission a few samples of Misteca songs are given here :—

Fragment of Misteca Love Song, "The Flower of the Mountain," collected and translated into Spanish by Sr. Abraham Castellanos.

"Ita nuh Yucu."	"La Flor del Monte."
Dodo nehi deke yuco	Del alto monte en la escarpada cumbre
Dacuiconi leluni	Vi que agitabas el airon gallardo,
Guemehdà yêdah	Y con este huipil te dije entonces :
Ni da cuico dâh.	"Adios mi amado ! "
Ita nuh yucu	Y yo tambien, desde el crestón altísimo,
Nicùli nùhlô.	Cuando fijé los ojos hacia el llano,
Nihjinon ditali nùh yuco	Te ví tan bella cual la flor del monte,
Ndicocótili nùhlô.	Que crece en los peñascos !
Ni kendítali	Cuando en el claro tú, y yo en la puerta,
Yeda bèhé,	Miré el aivón moverse entre tus manos,
Nijitandeli ichi yuco	"Ven," te dije, "no tardes amor mio !
Nucandòu !	Ven á mis brazos ! "

Translation : The Flower of the Mountain.

From the high mountain's precipice
I saw thee wave thy beautiful head-dress,
And with this "huipil" I said to thee,
"Good-bye, my beloved."

And I, from the high crest,
When I fixed my eyes upon the plain,
Beheld thee as beautiful as the flower
Which grows upon the pinnacles.

When thou in the open, and I at the gate
Saw the head-dress move in thy hands,
"Come," said I to thee, "do not delay, my love—
Come into my arms."

A Misteca Reverie.

SHASTNUNIR.	ASI PENSABA.
Dîhi cashi te yachi	Alegre claro y rapido
Tuù ihn quhiu	Amanece un dia
Sha shidoôtnaà u	Que cruzaba dos
Septiembrea.	Setiembre.
Nguer ndaur beher	Sali triste choza
Te nshicar nanducur	Y eché busca
Manü ngutur.	Buenas yuntas.
Shidor ihn yucu	Crucé un cerro
Te shidor ncá	Y subí otra
Te cuay nsheer	Y fin llegué
Ihn nu-yuayu.	Una muralla.
The shani-inir nucor	Y pensativo senté
Shito nur,	Dirigiendo vista
Dua, te ihn nunu	Doquier y un instante
Nane ndhi ja diqui	Aparece allá crestones
Dugju yucu ndiuhj,	Altas cordilleras limitrofes
Ihn sheine bico,	Una orgullosa nube
Tuinir shaî macucuee	Parecia no dilataba
Sha juhdau, te ngachir :	En llover, y dije :
Daudee güeshavi !	Tempestad segura !
Ntecur shaa daudi ndavido,	Oi que eco respondía
Ihn shío cannindei	En otro lado
Nudau yuco !	India cordillera.
Te duâ nshicar	Y entonces dirijo
Cunu yodo.	Hondo llano
Nu tuat cueet	Donde entre infinito
Kquiti	Animales grandes
Nanit	Estaban
Vah ngutur !	Placenteros toros.
Nshicar shit	Marcho ellos
Duâ nutnio	Hasta trabajo
Chihs deñ te shatu	Bajo y ardiente
Dua ngandi	Rayo sol
Nuhihoo shacada	En donde dedico
Tnior shit.	Trabajar ellos.
Nshee shañini	Llego tarde
Kicuat te ndetatut !	Libertad descanso.
Nut nushathit,	Vuelvan potrero
Dedo cunút	Donde gobiernan
Mengat ndait	Soberano bramido
Nini ruhj, na quidir !	En tanto yo me duermo.

The meaning of the literal translation is as follows:—

THUS THOUGHT I.

The second of September arises clear and rapidly. I left my dreary hut to fetch my good oxen. I crossed one ridge after another and at last came to a wall. And felt thoughtful and sat down, looking beyond to the high ridges of the far sierra, where appeared a threatening cloud which soon began to rain. And I said to myself: Surely a thunder-storm, I hear its echo from the other side of my native sierra. I descend into the plain below, where amongst many wild beasts stood my patient oxen. I marched them under the burning sun to the place where they had to work. With the evening came the hour of freedom and rest. Good friends, or herdsmen, return to the plain where you reign (over the animals) with your loud cries, and meanwhile I shall go to sleep.

The little love song speaks for itself, and the ploughman's reverie is not so bad either, at least it smells of the soil and of labour.

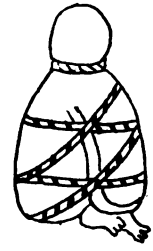
In quasi-monosyllabic language, such as this is, many words look alike, since their many slight variations of sound cannot be rendered by our alphabet; as Sr. Castellanos merrily remarked, the confusion, in a reverse way, is almost as bad as English, as he was fully aware of the bewildering resemblance of words like "thought" and "caught," "dough," and "doe," "brought" and "broad," "he rose," "arose," and "a rose," etc. However, that seems as nothing to what these American languages can do. I found, for instance, in Belmar's glossary of Chatino, that the syllable "koo" had thirteen absolutely different meanings, distinguishable by intonation and sound, and not to be confounded either with other approximate forms, such as "ku," "kua," "kee," etc. Lastly, be it mentioned, that these languages, especially Zapoteca, are highly developed, as much as, if not more than, the Azteca which, happening to be extensively employed by the old Spanish chroniclists, has attained to a kind of classical status, like the Maya, whilst the others have, until recently, been neglected. Moreover, whilst not much "literature" can be got out of the modern Aztec, it is otherwise with the two principal tribes of Oaxaca.

To the north-west of the town of Oaxaca rises the Cerro de San Felipe del Agua, to a height of a little more than 9,000 feet, which is short of the "official" height, viz., 10,200 feet.

In the tangle of hedges on the slightly rising plain *Cnemidophorus mexicanus* was abundant; and in shady gardens between stockades and cactus hedges there was also *C. bocourti*, whose forgotten habitat was thus at last rediscovered. At the village of San Felipe, about four hundred feet above the town, grow many "sabino" trees (*Taxodium*), upon which swarmed up and down *Sceloporus microlepidotus*, all the specimens coloured grey-green on the back, in harmony with the shading of these trees, and much in contrast with those found elsewhere. In the outskirts of the village, amongst a wilderness of untidy gardens, we were lucky enough to find many plants of the *Jalapa mirabilis*, so called from the fact that the flowers vary from red to yellow and white. The three colours, all pure, were equally represented, the respective plants growing side by side. Only a few of the seeds were ripe (at the end of September), and only one plant (with white flowers) has been reared in the Botanic Gardens at Cambridge. Large fig-trees, "higo del monte," with tiny yellow sweet figlets, grow in most of the villages of the district. At the foot of the mountain the *Cnemidophorus* gives way, and the beautiful *Sceloporus formosus* and *S. acanthinus* appear, amongst a profusion of small oaks and a few miserable specimens of pines. These latter, according to the natives, were here, at an altitude of 6,000 feet, quite out of place, a farmer credibly explaining the fact by suggesting that they must have sprung from accidental seeds. Soon there appeared red *Castilleia* flowers, fine forests of many kinds of oak, with a sprinkle of arbutus; a profusion of bulbous orchids in the ground, *Pinguicola*, sundew, and begonias, while the mossy limbs and stems of the trees were covered with various kinds of orchids. Near 8,000 feet elevation appeared magnificent evergreen oaks, mauve dahlias, deep blue tradescantias, blue lupins, and a pungent herb called "yerva del borracho," the drunkard's herb, an infusion of which is said to be a good remedy for the after-effects of too much tippling. In this moist cloud-land, at about 8,500 feet (the same level as our Xometla camp on Citlaltepetl), we found, to our joy, a few specimens of the little newt *Thorius*, hitherto known only from the Orizaba mountain; also some of

Gerrhonotus imbricatus, *Hylodes* toads, *Sceloporus microlepidotus*, etc.,—in fact, exactly the same fauna as at Xometla, whilst the vegetation also showed the same characteristic features. Next came "ocote" pines, very large "encino prieto" and "chino," arbutus soon giving away to *Alnus*, *Sedum*, *Castilleia*, mauve dahlias, tiny-leaved fuchsias, scarlet runners, a yellow giant thistle, fully ten feet high in bloom, ferns, mosses, and pendent tillandsias, and everywhere on moist spots, right away in the forest, big, wild maguey plants, this kind of vegetation continuing right up to the top, where, perhaps, the pines are the most predominant trees. Of bird life there was absolutely none, except near the foot of the mountain, where, near the banks of the streams, humming-birds flitted about in astonishing numbers and varieties.

Let us finish up with a short mention of one of the wonders of the world, a "sabino" tree, or "ahuehuetl" (*Taxodium distichum*), which stands in the little village of Santa Maria el Tule, near the road between Oaxaca and Mitla. It is a gigantic tree, still in full vigour and health, and jealously guarded by the people, who rightly will not allow so much as the tiniest twig to be filched from it. This beautifully-grown and symmetrically-spreading tree is said to have attained a circumference of one hundred and fifty-four feet. Upon this colossal and many-buttressed stem was fixed, a little more than a hundred years ago, a wooden tablet, commemorating Humboldt's visit. This tablet is already half-embedded in the bark and wood, which is now concentrically growing over it, and the growth is proceeding steadily, to judge from the extent to which the inscription was hidden in 1902, as compared with a photograph taken less than ten years before that date. The tree stands in the churchyard, at a spot which, without any doubt, was already sacred ground at the time when the Misteca, "sons of the trunks of trees," were worshipping at the glorious monuments of Mitla.



HIEROGLYPH—MITLA.
"Place of the Dead."

CHAPTER XIII.

IN THE STATE OF MORELOS.

The Sierra de Ajusco—Cuernavaca, Pottery, and Moths—Ancient Carved Lava Blocks—The Pyramid of Tepoztlan—The Hacienda de Chiconcuac—The Pyramid of Xochicalco.

The Sierra de Ajusco divides the Valley of Mexico from that of Cuernavaca. As the crow flies the distance between the two towns is scarcely thirty-five miles, but more than double that distance by the railway, which has to wind and climb by zigzags this tremendous mountain chain. It crosses the pedregal, or lava-field, which is studded with cactus, agaves, and scrubby evergreen oak, and at Contreras enters dense green forest. *Arbutus spinulosus*, chestnuts, oaks, "ocote" pines, juniper, and "sabino" trees, or "ahuehuetes" cover the slopes, whence descend numerous permanent streams, finding their way into the lakes which, in conjunction with the plain and the mighty city, make up a magnificent panorama. The powerful engine labours upwards into the mist, the air grows chilly, and by 10 o'clock, although we have started on a hot, bright summer's day, we shiver in spite of having on every available wrap. We are now at "Cima"—*i.e.*, the top—at an elevation of almost exactly 10,000 feet. "Ocote" pines are the only visible trees, so far as these have not been destroyed by the voracity of the railway. Before us is a highland scene of turf, and tussocks of grass and peaty bogs. Here and there is a patch of Indian corn, with miserable stalks. There are a few pine-board shanties, untidily patched and thatched with the cut-up tins of the ubiquitous Standard Oil Company; here and there are loads of charcoal or other fuel brought up by the natives on their small "burros"; empty tin cans and

boxes, coils of wire, strips of iron, are strewn about between the huts, the stacks of sleepers, the firewood and the other railway material, while the natives themselves, ill-clad, dejected and dirty in appearance, stand shivering about in the dripping mist, vainly trying to keep out the wet with their "zarapes," or native woollen blankets, whose usually lovely colours and still lovelier patterns are here, however, of a dirty sodden brown, the prevailing tone of these dismal surroundings. But this is all artificial, the mere "shady side" of progress. If it were not for the engine which, so to speak, has to get its wind, to drink and to feed, there would be no Cima station, and the "cumbre," or ridge, would appear in its impressive, stern, natural glory. The view seen from the next station, Tres Marias, or Three Maries, a trio of mountains, is not easily surpassed. Thence we descend through a forest of pines, strawberry trees, and oaks, where bracken, maidenhair, moonwort, mauve dahlias, scarlet salvias, pale pink begonias, and blue lupins abound. The broad, smiling valley appears below, now to the right, now to the left, and in front or behind, owing to the serpentine course of the descending train, which seems to be always trying to catch its own tail.

Cuernavaca is a clean town, and full of interest, even to those who have seen much of Mexico; it enjoys an exquisite climate at that most agreeable altitude of 5,000 feet, being neither cool nor oppressively hot, but a fine example of the "tierra templada," and hence much frequented as a health and pleasure resort; there are several passable hotels, all of them making compensation for their good points, such as situation, size of rooms, quietude, quality of food and service, in such a manner that these points are never combined in one; but all alike glory in the panoramic views to be seen from their flat roofs or "azoteas." Due north are the Tres Marias, to the east Popocatepetl, with Cortez' palace in the foreground. There is a large cathedral, with several other churches, and former monastic buildings; and the town itself has its public gardens, with here and there a graceful, royal palm, introduced from Cuba, spreading its gigantic fronds above the mass of red-tiled roofs; indeed, every day, if not every hour,

we discovered new ranges of hills and mountains, both near and far, together with extinct volcanic cones, precipices, valleys. slopes and villages, varying in accordance with the shifting clouds and the changing light. All very much like the landscape of some Italian pre-Raphaelite picture.

In the afternoon a thunderstorm coming from the south-

CUERNAVACA.

east gathers on these mountains, enveloping them in a dark blue impenetrable gloom which creeps steadily downwards, taking ridge after ridge, until the town is engulfed in torrential rain. Then the darkness lifts, the valley is again bathed in sunshine, the atmosphere is refreshed, and cleansed of dust, and an hour before sunset the gloom has blotted out in turn the western half of the amphitheatre, where the mountains hold the clouds far into the night.

The town is supplied with electric light, and the street lamps are an irresistible attraction to thousands of big and small moths of many kinds and colours. Some of these creatures measured four inches across their wings. On some evenings they began to swarm early, at others very late, but they appeared in their greatest numbers after midnight. Again, in some streets there were none, whilst in the next they whirled about in countless numbers. On two warm nights we went into the large garden of a friend, upon the outskirts of the town, and put up a lamp with a bright reflector. In spite of this and the many trees, shrubs, and flowers in the garden, we

CUERNAVACA.

scarcely saw a moth. It seemed as if they were all attracted by the many and brighter lights in the town. This is, indeed, said to be the case in other places, with the result that some years after the installation of electric light, the moths become practically extinguished, since endless numbers come to grief thereat, and forget to pair, for which purpose alone they fly about.

Separated from the town by a deep gorge is the "barrio," or parish, of San Antonio, with its chief industry of pottery, beautiful in shape and colour. The clay is blue-grey, but turns to drab in the oven, the fire being fed with cow's-dung fuel instead of wood, on account of the gentler nature of the heat obtained

from the former. The vessels made here are not really well fired ; they have to be porous, in order to keep the water cool by evaporation, consequently they are as brittle as they are graceful. The red colours are painted on, and white porcelain, bought for the purpose, is broken into small bits to form the ornamental inlaid pattern. The colours and painting devices are aboriginal, but the inlaid mosaic has been introduced from

BEAUTY AND THE BEAST.

Spain. Within the precincts of this suburb is one of the prehistoric sights of Cuernavaca, the well-outlined figure of a huge lizard, carved out of a big block of lava lying near the edge of the gorge, in what is now the ill-kept orchard of a poor Indian family, which charges an entrance fee of fifteen centavos.

Beyond this same gorge, which in a secluded spot contains a fine waterfall, lies, in a meadow, a large volcanic block, the Chimalli, so called from the incised coat-of-arms of some Aztec emperor ; a round, quartered shield with heraldic designs upon it, surmounted by a standard and crossed by, or laid upon

five spears. Above it is the broken head and neck of some creature. On the other side of the block are several dates, deciphered, but, as usual, not fitting into the Aztec chronology.

Only some three or four miles to the south-east of Cuernavaca lies the entirely native village of Tepoztlan, and above it a fine pyramid. Neither are visible from the town, although standing nearly 2,000 feet above the valley, but the spot is rendered conspicuous by the red-stained limestone cliffs which rise above the summit. This spot was, I will not say discovered, but practically introduced to the attention of anti-

TWO FEMALE IDOLS FROM TEPOZTLAN.

TERRA-COTTA IMAGE OF A SPANISH SOLDIER IN IRON HELMET AND MAIL-COAT, FOUND IN CUERNAVACA.

quarians only a few years ago by a young engineer, a native of Tepoztlan, who cleared the pyramid of the growth of shrubs and trees, and of the accumulated rubbish. The pyramid is situated upon a steep eminence, and consists of two terraces upon which stand the remnants of the temple proper, inside which are various chambers with many carved figures and dates. The outer walls of the terraces are not composed of stone, but are faced with a hard mortar, and this was painted red like some of the mortar-faced buildings near the pyramids of Teotihuacan. The long and steep ascent up to the pyramid, proceeding by successive staircases and little terraces, reminded one forcibly of the penitentiary stages which led up

to various renowned churches and monasteries of mediæval Portugal.

We presented our credentials to the Governor, Colonel Alarcon. After having started fighting on the wrong side, this gentleman became, later on, a valued comrade and brother in arms of President Diaz, and the Governorship of the State of Morelos is probably his reward, to the great benefit of this little State. A man of few words, but of many deeds, not given to society, he puts down any disorders with ruthless energy, and now devotes his superabundant vigour to the planning and fostering of works of peace.

The Governor, having been acquainted with our wish to visit the pyramid of Xochicalco and the Caves of Cacahuimilpa, most courteously provided an escort, and, what was more to the point, the necessary horses, so that the visit to these two wonders could be combined into one excursion, and at the same time take us on our way to the south without having to return to Cuernavaca. Accordingly, we left this town by train with all our luggage and outfit, and two hours later alighted at the station of San Vincente, whence we were taken to the Hacienda de Chiconcuac, which belongs to the widowed daughter of Benito Juarez, the late President of the Republic. Juarez, one of the greatest of the great men Mexico has produced, and who in turn has, with the still greater Diaz, made Mexico what it is, had a career typical of the rising Indian.

In every prefecture, no doubt all through the country, are exhibited the framed lithographed pictures of three men, a trio symbolic of the country's history. First, the tall thin figure of Miguel Hidalgo, with his beautiful, ascetic face, clad in his priest's dress, and with the sash indicating his nominal military rank of divisional general. This priest, of pure Spanish blood, was the first in 1810 to raise the standard of independence against the Spanish rule.

The second picture is very different; the head of Morelos looks like that of a rough peasant or a muleteer, an illusion enhanced by the handkerchief with which this warrior always bandaged his ever-aching head. Lastly, Juarez, the strong-featured, clean-shaven Indian, in his unassuming everyday dress.

The building of the Chiconcuac Hacienda, originally an old Spanish mission-house, with a chapel attached to it, had been turned into a strongly fortified mansion, and had undergone many adventures during the wars. Twice brigands had laid siege to the place and taken it, killing every man in it outright except one, who escaped only to die later of his wounds. The big courtyard was swarming with mules and cattle, the peones being busy lassoing the young bulls with the object of converting them into bullocks. A high wall, with fine old arches and niches, surrounds the yard, and hundreds of martins' (*Hirundo callorhina*) nests covered the entrance gate, in rows, each shaped like a wide-bellied flask, with a short, curved passage for entrance at the side. The family of the administrator, a veritable giant, did the honours of the place, but the night, spent in the gloomy, empty, vault-like rooms assigned to us, was made lively by the flat-bodied "chinches," which appeared in force to feast upon the strangers.

A "cabo," or corporal, with two "rurales," or mounted police, arrived with saddle horses. Mules for the baggage were found by the farm. At the breakfast, at sunrise, we were joined by an old gentleman and a young, dapper-looking fellow, who reported themselves as "la comision," selected by the Governor to act as our guides, and to give any local information required. This is worth mentioning, as showing that Colonel Alarcon did not do things in a half-hearted way. The old gentleman knew all about farming, traditions, the names of trees and plants, with their use and medicinal properties, and helped us to while away the time pleasantly, but his young companion was too modest to let out his special knowledge. The ride was over undulating ground, mostly cultivated with Indian corn, which, on the 18th of June, was just beginning to show its young blades. It is sown, or rather planted, at the onset of the rainy season; a man following in the wake of the plough, dibbling holes with an iron-spiked lance-like bamboo, and inserting therein the grain. After a pleasant ride of four hours we arrived at the range of low limestone hills, one of which is crowned with the famous pyramid of Xochicalco. There was already waiting Sr. Henrique Dabbadie, the Jefe

Politico of the district of Tetecala, with a force of six rurales. The son of a Frenchman and a Mexican lady, Sr. Henrique proved not only a most courteous and delightful companion, but a well-read cicerone. There is a tiny grass hut in which lives an old Indian as guard of the pyramid, to prevent the frequent visitors from pilfering, and further injuring the monument. He was quite a character, and had managed to pick up a few words of English, French, and German, which he wove into his voluble Spanish; his real native idiom is Aztec, which is still extensively spoken in the State of Morelos. There was a sumptuous lunch, roast chicken with chili, papayas, potatoes, aguacates, bananas, and plenty of bottled beer and wine, bread, and tortillas. Only water was absent.

The pyramid of Xochicalco is the most beautiful and best preserved of the many prehistoric monuments of Mexico. It is situated on a little plateau to the south-west of Cuernavaca, on a range of limestone hills. The whole ridge was fortified, here and there, with little forts protected by walls of hewn stones and ditches. Some, as, for instance, those of the neighbouring Xochitepec, on the top of one of the highest hills, have never yet been visited by any antiquarian. The slopes of the flat-topped plateau, on which the pyramid stands, still show many lines of earth-and-stone works rising in tiers one above the other. The wide central court was surrounded by a high wall, now much dilapidated. The pyramid itself is a square, each of its four sides being nearly seventy feet long, and facing exactly the four cardinal points. It consists of only two stories, or rather, of a basement with one story. The core of the mound is composed of blocks and rubble of limestone from the immediate vicinity, but it is faced with large blocks or thick slabs of volcanic stone, andesite, which had to be fetched from afar, dozens of miles away. The means by which these unknown builders transported these heavy pieces remain as much a mystery as those by which they managed to cut and carve most carefully these volcanic blocks with their primitive implements of stone, obsidian, copper, and bronze.

The sloping walls of the basal portion are a little more than

twelve feet high ; then comes a kind of narrow ledge, and then a wall, likewise square, and with sloping outer sides some six feet high. In the centre of this enclosure lie several large blocks, which have been dislodged. In the middle of the western side is a staircase, apparently double, thirty feet wide, and with about a dozen steps. Opposite the top of these stairs is an equally wide gap in the inner wall. Unfortunately, many of the blocks of this wall have been disturbed, many are now

THE XOCHICALCO PYRAMID.

lying at the bottom, and, what is worse, others have been carried away for building purposes. The French, during their occupation, also played havoc with this monument, the beauty of which consists to a great extent in the exquisite carving of every one of the stone facings, which are so well put together, allowing for the slope, that it is often difficult to detect the joints. The principal figures are huge "quetzalcoatl," snakes ornamented with feathers. On each of the north, east and south sides is a pair of these snakes so arranged that the heads

are in the corners and the tails in the middle of the side. The heads themselves, with open fanged mouths, and ornamented with long plumes, are turned inwards and backwards, and consequently look away from the snake on the neighbouring side. The result of this arrangement, when viewed from the corner, is striking; the heads and first coils of the creatures combined giving the impression of a double-headed heraldic eagle. The snakes of the north and south have four coils or

THE XOCHICALCO PYRAMID.

bends each, those of the east wall only three. In one of the coils of every snake sits a cross-legged man, with a rich head ornament, much like certain figures on Indian temples. In a neighbouring coil is a cartouche with a date, which cannot yet be read, and if it has been interpreted rightly as meaning "nine rain," such a date does not at all fit into the Aztec chronology. The short portions of the western wall on either side of the staircase show snakes with one coil only, but several dates which contain the numbers, 2, 4, 6, 9 and 10. The sides

of the staircase are likewise ornamented, and we find there the same cross-legged person. The outside of the upper wall contains many carvings, mostly dates, but also the figures of a rabbit, eagle with widespreading wings, and a coyote. The blocks which form the entrance to the top chamber show the lower half of a standing man; the slabs containing the upper half are lost.

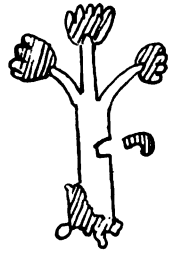
Most puzzling, but also most suggestive, is the cross-legged squatting attitude of the frequently recurring man, and, above all, the fact that in the dates the number 5 is invariably represented by the symbol of a long tied-up bundle; and the number 10 by two such bundles; the other numbers are represented by as many circles as units, and these are eventually used in addition to the five-symbol. This was exactly the style of Maya and Zapotec writing, a method not at all used by the Aztecs. We shall have the opportunity of returning to this point, which throws some light on the origin of this pyramid, in another chapter.

It is supposed that this pyramid was dedicated to the goddess Xochiquetzal, a personage of many accomplishments, and possessing an intricate mythology; the goddess of love and of flowers, who, having tempted the god Quetzalcoatl, became the first mother on earth, and eventually his wife, and then became with him the principal deity; both being of foreign descent and, like most good things, adopted by the conquering Aztecs. The Aztec name of this goddess means "Flower-Quetzal," the beautiful metallic resplendent trogon, the *Pharomacrus mocinno* of Guatemala, "quetzal" being still used as a term of endearment. The pyramid itself is called Xochicalli, the flower-house, and the place is Xochicalco—in or at the flower-house.

Within a short distance of the pyramid is a small fortified hill called Loma de la Malinche, on which stood a large stone slab, now broken, with the carved figure of a woman, also sitting cross-legged. It is a very fine piece of work. The image is surrounded by a carved frame with designs of flowers, and above the imposing headgear is a row of five little children, holding each other by the hands. Now this goddess is known

as La Malinche, the name of that romantic native girl who acted as Cortez's faithful interpreter, spy, adviser, and wife.

In the middle of the courtyard, opposite the staircase, but a little more to the north, now lies a remarkable block, the so-called Piedra del Sacrificio. It is of the shape of a human torso, rather larger than life-size, without head and without legs below the knees, and lies in a recumbent position, with the ribs well worked out, and with a deep opening in the middle of the chest. This representation of a flayed human body, with the heart torn out, indicates plainly what these people formerly did on the top of their beautiful flower-house.



HIEROGLYPH - CUERNAVACA.

Cuauh = tree; *nahuac* = near by.

Expressed by the signs for mouth and tongue, "Near the Forest."

CHAPTER XIV.

THE CAVES OF CACAHUIMILPA.

Scorpions as a Cure for Hydrophobia—The "Animal Plant"—The Gigantic Caves of Cacahuimilpa, and their Fauna.

A ride of five hours, enlivened by a sharp thunderstorm, brought us from the pyramid of Xochicalco to Tetecala, with its offensive and unclean inn, which, for dirt, untidiness, and unwilling service, held the record. The little town is situated near a somewhat swampy plain where rice is cultivated, and there is much suffering from "paludismo," or malaria.

The next morning we started for the caves, in quite a cavalcade, which included seven soldiers, besides servants, ourselves, the Prefect, and two friends who had attached themselves to the party: fourteen people in all, and then we were joined by an elderly fellow who had got into the habit of showing off the caves in the capacity of honorary guide.

There is a handsome tree called "guayacan," or "tamahuatl," of the genus *Tecoma*, one of the bignonia family, which has a dense foliage on its extensive branches, and is said in the winter to be one mass of big brown-violet flowers. But the tree which is sure to attract most attention is the "cuautecomatl," a *Crescentia* or *Parmentieria*, another kind of arboreal bignonia. Its brown, leathery flowers grow out of the big branches, often out of the trunk itself, and its green, apple-like fruits of the last season are a curious sight, attached as they are to the branches and stems far away from the green foliage. The fruit is poisonous, and was said to have killed many a tired and hungry wayfarer, who could not resist its

inviting look and sweet, juicy taste. It contains an acid which is used as a purgative, and a decoction made from the fruit is valued as a remedy for cough and other chest complaints. Whilst the "cuautecomatl" is studded about over the open plains, which are mostly of sandy and limestone formation, the "cuagiote" (*Pseudosmodingium perniciosa*, of the terebinth family) forms little clumps or copses on stony slopes. It sheds its leathery leaves during the dry season; its hard wood gives out great heat; and its specific name, *perniciosa*, refers to the milky juice which exudes from it, and dries up into a kind of gum or rosin. This sharply irritating material, softened with saliva, is rubbed into the skin as a remedy against the bite of the scorpion, which is very common in these parts. *Apropos* of these scorpions, Don Henrique had a remarkable story to tell. A man suffering from hydrophobia was, according to custom, taken away from his house, tied to a tree, and left there to die. But on the following morning the self-constituted sanitary authorities found him not dead but alive, and imploring them to release him, as he had been attacked overnight by scores of scorpions, which crept out of the bark of the tree, stung him, and caused maddening agony. He had then fainted to awake in a profuse sweat, cured of the terrible disease. Ever since this occurrence, scorpions are looked upon as an infallible antidote to hydrophobia. I cannot tell whether this belief had stimulated some of the gentlemen at the Instituto Medico in Mexico City to study the properties of scorpionine, as the poison is sure to be called when some analytic chemist has separated it into its constituents (with a string of names a yard long), but I can vouch for the fact that in the summer of 1904 they had there a large consignment of scorpions from the State of Morelos. They had already written one original paper "On the time that it takes to starve a scorpion."

People who profess to take an interest in Mexican natural history are sure to mention the case of the "animal planta," a miraculous creature, half plant, half animal, which crawls about on the ground, and throws out a miniature tree with branches, which then, like certain caterpillars, takes a deliberate

step forward, buries itself again, and in this way gradually progresses. One of these creatures is not uncommon in the temperate regions of the States of Morelos and Puebla. It is really the larva of a cicada, which, living under ground like that of a cockchafer, is invaded by a peculiar fungus.* This parasite, living upon the substance of the larva, ultimately grows into a yellow-branched fungus some two inches high. But there was said to be another kind of vegetable creature or "animal plant" in the State of Oaxaca. President General Diaz had the kindness to ask me whether I should like to study it, as he had never succeeded in getting a proper account of it. He, by the way, surmised that it was a plant which, however, presented certain curious phenomena. The President's slightest wish is law, and several specimens of the mysterious object were procured from Oaxaca. They proved to be a kind of stick-insect, *Phantosoma*, or *Pseudosermyle*. They were partly embedded in the ground, which was composed of black humus, in a vertical position, with the abdomen and part of their long legs sticking out. Apparently they had been drawn into this queer position by the agency of some other animal (maybe earthworms or ants, which draw feathers, haulms, etc., into their holes). So far, the animal portion of the mystery could easily be accounted for; about the plant or the fungus, nothing could be ascertained, as the wise men, who were charged with keeping the whole mass, soil and all, in a suitable moist and warm place, allowed everything to dry up in a cupboard.

"EL ANIMAL PLANTA."

A cicada larva with a fungus of *Cordiceps*. (Nat. size).

* A. de Castillo, "Boletin Soc. Geo. y Estad," X. Mexico, 1864.

Half-way between Tetecala and the caves we stopped at a grand hacienda, administered by a young and accomplished gentleman. There we joined Don Henrique's wife, her three daughters and little boy, and, after breakfast, we rode forth, our party having increased to twenty, through swampy ground, among clumps of cocoanut palms, then by rather stony tracks, up and down, over limestone country, and arrived by noon at the village of Cacahuimilpa. There a disagreeable surprise awaited us. The cave had, within the last year or two, been got hold of by some Orientals, who had turned it into a business concern, and had advertised far and wide the incomparable vastness and beauty of this wonder of the world; a good road led to the cave, the modest but comfortable hotel, and illuminations with Bengal fire and magnesium, etc. To make things especially easy for us the travelling department of the Mexican Central Railway had applied to the owners for special facilities. On our arrival, however, an Indian who combined the offices of guardian of the cave and hotel keeper, produced a telegraphic order, just received from the owners, forbidding anyone to enter without a special pass, either to explore or to take photographs. The fee for people provided with a special permit would be five pesos each, and the key to the hotel was said to be in Mexico! This roused the temper of Don Henrique to white heat. It was, of course, easy to brush aside the prohibition, but we paid, and got a receipt for thirty-five pesos,* for which neither torches, guides, or any other kind of help whatever were provided, and then scrambled on horseback for a whole hour over one of the craziest tracks imaginable, a track such as only a limestone country can produce. The cave entrance lies about four hundred and fifty feet below Cacahuimilpa, and, as is usual with such caves in the side of the mountain, high above a dry gorge. It is a big cavity and very long, but there is scarcely any water in it, and the stalactite

* To avoid any false impression about this "disgusto," or "disagreeable and insulting incident," it may be stated that a letter ultimately reached me in which the cave directors graciously granted my whole party free entrance to their cave. But the letter was dated several days after the event, and when it had become public knowledge that the Governor of the State of Morelos had arranged for our excursion.

formation is rather poor, giving the impression of its having been stopped soon after the commencement of the formation of the tunnel. There is a small pool in the first large hall, the Salon del Chivo, with a stalagmite three feet high opposite the entrance, in which fancy discerns the figure of a he-goat. Elsewhere there are but few stalactites, and those small ones; but two large buttresses, irregular in shape, and partly encrusted with a yellowish-white deposit, mark the passage into the Salon de las Fuentes, which, by the way, does not mean the hall of fountains or springs, but simply of water-pans, the floor being formed by many little sloping terraces of stalagmites, the ledges of which here and there hold a little water. So far the light of day still reached dimly. Then the ceiling becomes lower, and the cave slopes sharply down, strewn with many boulders which have fallen from the roof, and we next find ourselves in the Salon de los Hornos, or furnaces, which has many pretty encrustations; soon after comes the Salon del Muerto, where the skeleton of a man and a dog, with a water-jar beside them, is said to have been found amongst the wilderness of fallen blocks. A further passage contains curtain-shaped stalactites, some of which are pure enough to emit a musical sound when struck. A narrow and difficult passage leads to the "lake," which is a little shallow pool, a few yards across. Still, a certain painter, Landezio by name, who had visited this cave in 1846, urged in his report the necessity of taking a boat into the cave to cross this lake! However that may be, the poor Empress Carlota of Austria went into the next chamber, and there left a record, and here ends that portion of the grotto which is traversable.

But what about its dimensions? One guide-book says there are caves in other parts of the world, but they are all small compared with this; the length of the practicable passage is calculated to "be six kilometres, more or less," which should mean from three to four miles, let us say less, since that would be the rate of an hour's ordinary walking on a good road. Rockets let off are said not to reach the ceiling, at a height of hundreds and hundreds of feet above the floor. Now, one of its grandest caverns averaged but sixty-five steps

across, from wall to wall, and this was, so far as we could judge, the diameter of the almost circular tunnel, one-third of which is filled with the *débris* of which the floor is composed. Still, a natural tunnel one or two miles long and occasionally reaching to a height of a hundred and twenty feet is an impressive sight, though for beauty, variety, and fineness of the stalactites it cannot be compared with the caves of Adelsberg, in Istria, and the Mammoth Cave in Kentucky need likewise not fear its competition.

Close by is a more moderate-sized but prettier cave, the Gruta Carlos Pacheco, so called after a famous general. The sources of the Rio Amacusac are in this mountain, one, the Rio de Santiago with milky water, and the other, the Rio de Chontacuatlan with clear water, both coming out of the deep, narrow gorges or fissures in the mountain side, and soon uniting to form the Amacusac, which empties itself into the Balsas river. Ordinary mortals cannot penetrate far into these river gorges, and for what is inside them one has to trust to the lies of the natives. One of them, for instance, professed to have gone very far and, as usual, to have encountered a huge lake. According to himself, he lived in that cave for three weeks while he was exploring, and when asked what he had subsisted on, he replied: "Oh, I caught fish, big fish, as long as my arm, and they were all blind, having no eyes at all!"

There is a small cave fauna described by A. L. Herrera, who was a member of the exploring party of the Instituto Medico.* The most interesting is a little *Lepisma*, which is quite white, and has lost its eyes completely, compensating itself for their loss by developing very long antennæ and three long tail-filaments. A grasshopper, likewise with extraordinarily long antennæ, inhabits the entrance chamber, and has its eyes reduced to one-third of the normal size. I found the *Lepisma*, which was discovered in the lowest cavern, where utter darkness prevails, on the walls where the dim light is still discernible, but—perhaps owing to bad luck or want of leisure—no living things were found further in.

* "Fauna cavernicola." Antonio Alzate, Vol. VI. (1891), pp. 218-220.

The settling for the night of the many ladies and gentlemen was not an easy matter, not only the key of the "Hotel de la Gruta," but this building as well not being in evidence. We distributed ourselves as best we could in two houses, each protected by half of the force of rurales stretched out in front of us, and most of the party presented a miserable spectacle next morning, since sleep on a "petate," or straw mat, on the earthern floor in an Indian hut amid the disturbances occasioned by many noises and by voracious insects, and with a thunder-storm overhead, is not sufficiently restful after a long ride and several hours' scramble in a cave.

When we arrived at the hacienda our friendly host regaled us with a sumptuous dinner, after which the ladies preened their ruffled plumage, saw to their bruises, blistered necks and shoulders, which had been insufficiently protected by their cotton dresses; and last, not least, they powdered themselves, dipped their well-groomed finger-tips into water, and were then prepared to enter a coach, which jolted them home, escorted by the whole crowd of caballeros. Never have I seen so many examples of lizards, or of *Sceloporus*, or of the large iguana, or *Ctenosaura*, as I did during that hot afternoon's ride; every hollow tree, every stone wall, was tenanted.

It rained heavily during the night, and when we emerged from the dirty inn of Tetecala our Prefect and force were ready, not to say good-bye, but to conduct us straight to Puente de Ixtla, the nearest railway station. Was it necessary to incommode him; could we not find our way alone? "That may be, my friend, but my orders are to see you personally out of the State of Morelos and safely into the train." Greatly did we enjoy his genial, ever-attentive company during the ride of four hours and a half, through fields of rice and sugar, over hills and dales, and, fortunately, the much-dreaded crossing of the Rio Tembembe was easily accomplished; nor was it necessary to accept the hospitality of the Amor family, the feudal lords of that district, with their vast and beautiful hacienda, "San Gabriel," to whom the thoughtful governor had given us an introduction.

At Puente de Ixtla the train drew up, "en su hora," on time, and we shook hands with Don Henrique Dabbadie, he to return to Tetecala, we to arrive at Iguala before nightfall.

CHAPTER XV.

THE ANCIENT CIVILISATION IN MEXICO AND ITS ORIGIN.

The Problem—The Toltec Question—The Aztecs and other Nahoa not the Builders of the Ancient Monuments—The Civilisation of the Aztecs' Empire not of Aztec Origin—The Famous Almanac or Tonalamatl—The Chronological and Calendric System—The Time-bills on the Central-American Monuments—An Attempt to Solve the Question of the Zero of their Reckoning—The Aztec Hieroglyphs—Successive Migrations of different Nations in Mexico—The Native Languages—Whence came these People ?

Having seen most of the principal prehistoric ruins of Southern Mexico, it was but natural that we fell under the spell of the mystery which covers them and their builders. Popularly they, like everything else antique in Mexico, are called Aztec, and this name stands for the whole of the considerable civilisation which the Spaniards found in the country. That this is a misnomer, at least an exaggeration, we knew, but not much else. We have seen something of the many strikingly different tribes: have seen unique private and public collections: have even picked up a few things ourselves, and have heard what the people, the natives, had to say about them.

Lastly, there is a great amount of literature* in Spanish, English, and German, open to those who will and can read it. But then our troubles began, since the views held by the various authorities are so very divergent. Of course, I may perhaps have read too much: some of the works being very learned and splendid in detail, others written to establish preconceived

* Notably E. Seler, "Gesammelte Schriften Amerikan. Sprachen u. Alterthumskunde," 2 vols., Berlin; Foerstemann and others, the Collected and Translated Papers published by the Smithsonian Institute, Washington, 1904.

notions regardless of evidence. However, not being those of a professional, and being warped by no special prejudice, my own conclusions, although those of an "afficionado," an amateur, or *dilettante*, may contain some sense. The problem is: Whence came the civilisation of the Aztec Empire?

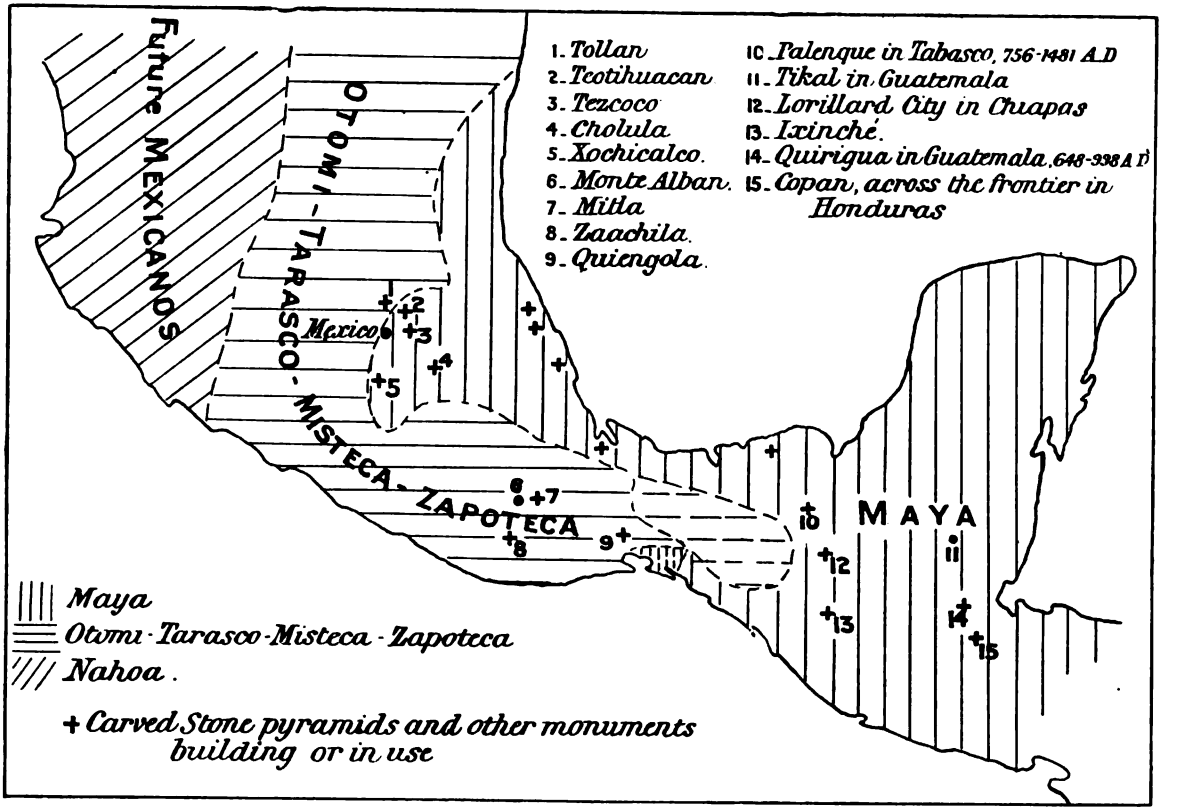
Concerning the Aztecs themselves, they are one of the many tribes of a large family, which we shall call Nahoa,* and of these tribes they became the military dominant stock not so very long before the Spanish conquest. The Nahoa are not aborigines in the southern half of Mexico; they came from the north-west, where their linguistic affinities seem to link them with south-western tribes of North America, whilst tribes linguistically related to them are still living in, and on either side of, the long western Sierra Madre of Mexico. They spread all along the Pacific coast from Sinaloa to Oaxaca, and form a broad belt right across Mexico to the Atlantic coast, this belt representing an arc, roughly speaking, from Acapulco to Mexico City, Puebla and Vera Cruz, and down the coast to Coatzacoalcos. It is certain that this belt, which is still inhabited principally by Nahoa, has partly overrun and partly driven out other nations. As has always and everywhere been the case with such migrations, there were other indigenous races there before them. To the north of the arc mentioned above, were, and have remained, the Tarascos and the Otomi, the latter a boorish but hardy race. The Otomi still inhabit a considerable portion of the central plateau, and numbers of them daily bring wood and charcoal to the capital from the Sierra de Ajusco. But in the valley itself, and thence eastwards, the migrating Nahoa came into contact with another nation, who had been settled there for hundreds of years, and had reached a high state of civilisation. These were the "Toltecs." Calculations and guesses, based upon the "Anales

* Nahóa was the term for all those who spoke dialects akin to that of the Aztecs, and these various tribes together were called Nahuatlaca, the neighbour-people. It is one of those words which seems to have acquired many meanings: "near by," "around," "round," "mouth," possibly "speech." Anahuac, "land near the water," was the term for the Pacific and Atlantic lowlands. The Mexican savants spell the word "nahöa," with accented o, although the proper pronunciation is something like nähva.

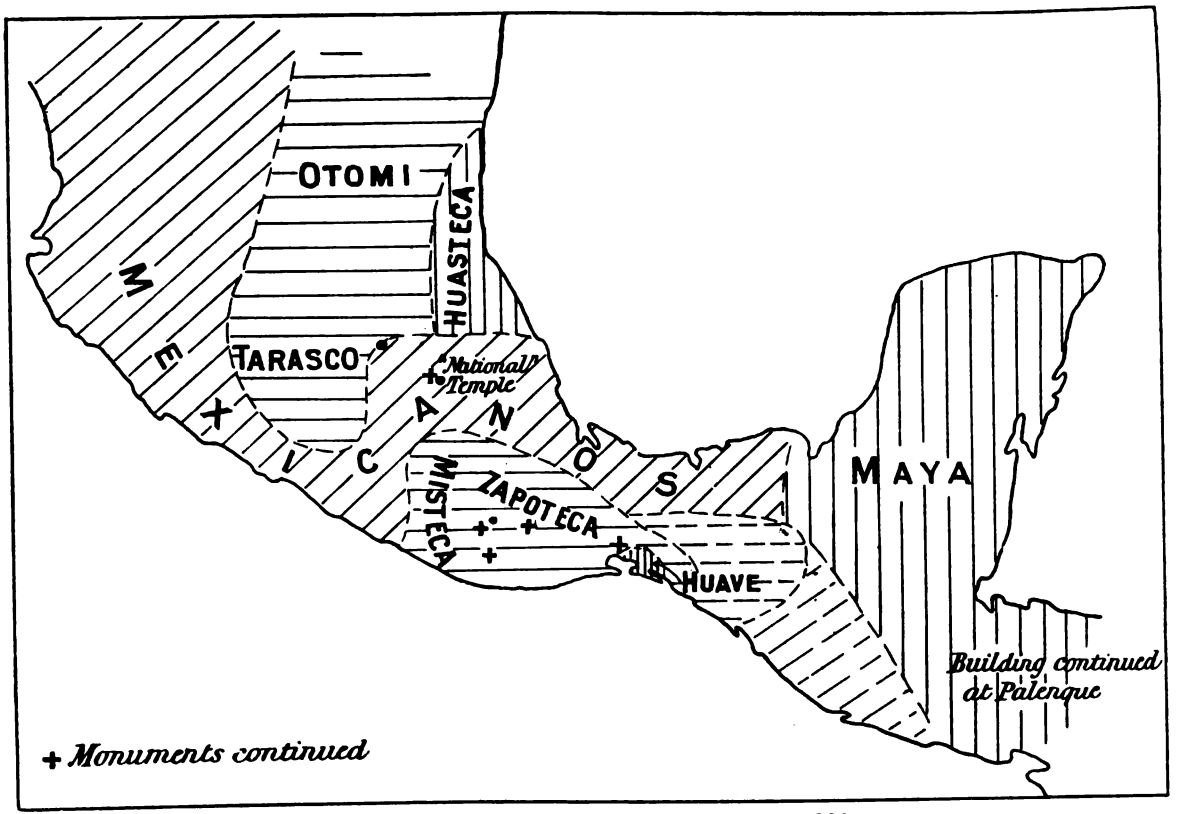
de Quauhtitlan," have been made to the effect that the Toltecs arrived there about 700 A.D. They were gradually pressed eastwards by successive waves of the Nahoa tribes, the last of which to arrive were the Aztecs, about 1200 A.D. In 1325 these founded a lake-dwelling settlement, Tenochtitlan, on the site of the present city, but it was not until 1427 that they formed an empire, by making tributary the kings of many tribes and various alien nations. This empire, having been destroyed by Cortez in 1521, was consequently scarcely of one hundred years' duration.

There were traditions that these "Toltecs" withdrew before the new arrivals towards the east to the Atlantic seaboard, as far as Campeche and Guatemala. Hence the fable that their chief god, Quetzalcoatl, the feathered snake, went into the sea (perhaps at Coatzacoalcos, which, if read Coatl-tzacual-co, would literally mean "in the snake's prison"), but promised some day to return; meanwhile, to console those of their kindred who remained on the plateau, the Toltecs left them their buildings, gods, and almanacs, or instructions how to worship them.

By what route the Aztecs arrived in the Valley of Mexico is unknown; most likely from the south, following the line of least resistance, which in this case would be between the wild Tarasco-Otomi and the Toltecs, with their kindred, for whom I suggest the Misteca-Zapoteca family. At any rate, they got there, and having arrived they changed their name Azteca into Mejica, a word of unknown meaning. Since they had become the dominant race, the Spaniards named the rebuilt capital, the old Tenochtitlan, Mexico, and all the members of the Nahoa-speaking stock became generally included under the term Mexicanos, whilst the name Aztec fell into disuse. Long before that the true Mexicano dialect had superseded all the other Nahoa dialects, partly thanks to its superiority, partly because it was the speech of the ruling race. The term Aztec has, however, been artificially revived, mainly in order to distinguish these Nahuatlaca from the inhabitants of the Mexican Republic generally, all of whom are, of course, politically "Mejicanos." The better and more comprehensive term is



DISTRIBUTION OF PRINCIPAL NATIONS BEFORE 1000 A.D.



DISTRIBUTION OF PRINCIPAL NATIONS AFTER 1300 A.D.

Nahoa, pronounced "nahwa," now used by Mexican savants themselves.

Leaving this political meaning of the word alone, only those tribes of natives that do not belong to the Nahoa group have retained separate names of their own, but names which have been given them by the ruling Mejica. These Aztecs were terrible fellows for renaming every river, mountain, village, town, and tribe with which they came into contact; and the Spaniards, taking over the Mexican Empire, retained these names, so that most of the original ones have become almost, or quite, forgotten.

The so-called Toltec question is in a great muddle. According to some writers they were the aborigines of the southern plateau; others have written long essays to prove that they belonged to the Nahoa group, like the Aztecs, whom they consider as the originators of the whole Mexican and Central American civilisation; lastly, some have tried to cut the knot by declaring that there never were any Toltecs, that they are fabulous. Now, assuming that such a people have vanished as a nation, it is reasonable to suppose that they did not clear out entirely from the plateau. There are even unmistakable statements that such people did remain, and these, learning the language of their conquerors, became occasionally included amongst the Nahoa. This applies, as is known for certain, to the inhabitants of the town Tollan, now Tula, fifty miles north of the capital, on the Central Railway. That was a very ancient place, the most north-westerly outpost of this mysterious people, and since it was here that the Aztecs first came into permanent contact with them, they called them naturally Tolteca, the men of Tollan, and this term became applied to the rest of the race, of which they were a mere remnant. This seems obvious enough. Further, although the Aztecs had established their empire, there remained, even at the time of the Spanish conquest, a number of "kings" even in the immediate vicinity of the capital, for instance, at Texcoco and Tlaxcala, with whom the Aztecs frequently quarrelled, who themselves had come into the country with no less than eight other Nahoa tribes, the Aztecs themselves

consisting of six clans! All of these must have been ridiculously small, petty States, like those of ancient Greece, bickering with each other, and fighting for the hegemony.

What do we know of the civilisation of the Aztec empire? There are the monuments, a number of preserved writings, innumerable implements and works of art, and the accounts of the Spanish historians. There is no doubt that this civilisation had reached a high level. Let us first consider the monuments in Mexico. Near Oaxaca are the palatial buildings, the royal residences and mausoleums of Mitla. They belonged to the Zapoteca. On the other side of the town, the grand buildings on Monte Alban were a stronghold of the Misteca nation, akin to the Zapoteca; and the same applies to Zaachila, Quiengola, and various other ruins in the State of Oaxaca, where the Mejicanos have never gained a foothold. The pyramid of Cholula, near Puebla, well near the heart of the empire, is a huge mound, built in terraces with sun-dried bricks, clay, and limestone, and about 180 feet high. On it stood a big temple with the image of Quetzalcoatl, the chief god; but this temple and the large town of Cholula, with its hundreds of towers, were there already when the Nahoa reached this district, and they attributed the buildings to a fabulous race of giants. But they kept the temple, and adopted Quetzalcoatl as the chief deity of their growing empire. The fanatic Spanish priests promptly destroyed everything, and much later they put a big church on the top of the pyramid, which now looks like a natural hill, thickly overgrown with shrubs and trees. The pyramids of the Sun and Moon, at Teotihuacan, have been described in the first chapter. The important point for the present discussion is that they also are prehistoric and had been abandoned, and cleared of their treasures, by the fabulous race which built them. The beautifully carved pyramid of Xochicalco, described in the previous chapter, is likewise known to have been deserted, and no longer used during the Aztec domination. In the State of Vera Cruz, from Tampico to the Isthmus, are also ruins of fine terraced pyramids, as, for instance, at Papantla, Huatusco, Tuzapan, and there are probably many more that are scarcely known, like the little

pyramid near Tetela; while beyond the Isthmus in the land of the Mayas, are the world-renowned monuments of Palenque, Uxmal, Copan, etc. All these were quite beyond the reach of the Mexican Empire. Great buildings, mostly constructed of sun-dried bricks, occasionally with terraced pyramids, and even with stone carvings, of a much cruder type, exist also to the north of that empire, for instance, at Quemada, near Zacatecas, and the so-called Casas Grandes in north-western Chihuahua, but these are said to bear a resemblance to similar constructions in New Mexico and Arizona. Therefore we must not allow ourselves to be carried away *in infinitum*, otherwise we might as well consider the Peruvian monuments. For our purpose we must restrict ourselves to Southern Mexico. If we assign all the buildings of this part of the country to the mysterious "Toltecs," it does not follow that these were the first people who in America had attained to some state of civilisation, although they may have been there for a thousand years. Spaniards to-day, Aztecs yesterday, Toltecs the day before yesterday, what light does this throw upon last week? We are too liable to take some fabulous hero as representing the beginning of things, forgetting the warning *vixere fortes ante Agamemnona*. Our point is that none of the great and glorious monuments which are popularly paraded as belonging to the Aztec civilisation, have anything to do with the Mexican Empire, but that they were built by a prehistoric, totally different, race. But were there no Aztec monuments? Certainly there were. Everybody knows of the big Teocalli, or god's house, in the city of Tenochtitlan, with its many other temples. No doubt others existed in other towns, but all these have been completely demolished by those fiends, the Spanish priests. It is important to note that these fanatics destroyed all those temples which were built by, or still used as places of religious worship by the Aztecs, while they spared those which were pre-Aztec, such deserted monuments being considered harmless.

Are we not justified in concluding that the Aztecs, having come into such an inheritance, adopted this civilisation ready made? It was easy for them to have new temples built with

the old samples before them, whilst good workmen, artists, and savants could always be procured from the tributary alien nations.

What we know of the culture, religious rites, and learning of the Mexican Empire has come to us in two ways. There are still preserved several so-called codices, genuine Indian productions, written on deerskin or on agave paper, folded in book-form and painted in many colours. There are, further, many sheets which contain the accounts, kept by the official Aztec receivers in the capital, of the annual tribute of the subjected tribes. Further, a few of the Spanish monks, men of high culture and learning, had the good sense to engage learned Indians to paint in their own hieroglyphics the traditions of their tribes, the characters of their gods, etc., and, what is more, the monks in some cases wrote against the pictures an elaborated explanation in the Aztec language, but in Spanish cursive characters. Lastly, others, especially Sahagun,* had the brilliant notion of having a whole history of the Mexican Empire written down in Spanish characters, but in the Aztec dialect, from the dictation of native professors of history and theology.

The standard of civilisation reached was fairly high, and it seems to have been of much the same kind amongst all the more intelligent tribes of the plateau and down to Yucatan and Guatemala. This uniformity of civilisation is shown, above all, by the calendric system used alike by the Mejicanos, Zapotecs, and Mayas. This system is so absolutely unique that it can only have been invented once. It is worth a description, especially since we shall be able to draw some conclusions from it. They had two calendars, a civil one of about one year's duration, and an ecclesiastic almanac of two hundred and sixty days. This almanac was called "tonalamatl" (literally meaning the "day-paper"), the "day-book." This book was used entirely for augury and

* Bernardino de Sahagun, "Historia general de las cosas de Nueva España. Republished, Mexico, 1829. For illustrations *cf.* Lord Kingsborough's sumptuous folio volumes by Aglio, "Antiquities of Mexico," vols. V.-VII., London, 1830.

horoscopic purposes, and really formed a complete epitome of their knowledge. Every day, and every hour of the day and night, had some deity presiding over it, and their theosophy, with its personifications and legends—some beautiful and subtle, some obvious and far-fetched, some elevating, and some revolting—was as complicated, reasonable, and at the same time as fanciful, as was that of the Greeks and Romans. The tonalamatl consisted of twenty sections of thirteen days each; let us say twenty day-signs, or names, combined with the numerals 1—13; and by a peculiar combination the whole thing was so arranged that the first day of each section received the cypher 1, while the twenty day-signs went on being repeated in the same order, so that, for instance, the first day of the first section begins with and is called 1 Crocodile; but, there being twenty such day-signs, the next Crocodile day falls upon the eighth day of the second section, and this day is therefore known as 8 Crocodile. Thus, every one of the two hundred and sixty days had an absolutely fixed name, number, and position. In every country where this tonalamatl was in use the day-signs followed in the same order, and, with slight variations, the signs themselves were the same.

The twenty signs, with their Aztec names, are as follows :—

1. Cipactli, the Crocodile.
2. Eecatl, the Wind.
3. Calli, the House.
4. Cuetzpalin, the Iguana, or, rather, the "Leguan."
5. Coatl, the Snake.
6. Miquiztli, the Skeleton, or Death.
7. Mazatl, the Stag.
8. Tochtli, the Rabbit.
9. Atl, the Water.
10. Itzquintli, the Dog.
11. Ozomatli, the Monkey.
12. Malinalli, the Twisting Herb.
13. Acatl, the Reed.
14. Ozelotl, the Jaguar.
15. Cuauhtli, the Eagle.
16. Cozcacuauhtli, the King Vulture.
17. Olin, the Rolling Ball.
18. Tecpatl, the Flint.
19. Cuiauitl, the Rain.
20. Xochitl, the Flower.

Now, for our purpose it is most important to note first that every one of the prototypes of these signs, creatures, and plants occurs in the tropical parts of Mexico and Central America; secondly, that several of the animals are absolutely

foreign to the plateau of Mexico. These creatures are the crocodile, jaguar, monkey, the "necklace-eagle," or king vulture; and we may safely add a fifth, the "cuetzpalin," which is usually translated as lizard, but this creature is always painted blue, was the patron of water, and from the old historians we gather that it was sacrificed and eaten, and that, whenever possible, specimens of the blue kind were taken. All this only fits the "leguan," the *Iguana tuberculata*, an absolutely tropical and semi-aquatic lizard, the largest in America; not the black iguana, or *Ctenosaura acanthinura*. The giant snake, "coatl," is, of course, the boa, which is likewise absent from the plateau, although often figured with the rattlesnake's tail. In any case at least five, if not six, out of ten creatures being foreign to the plateau are, to my mind, strong evidence that these day-signs were not invented on the plateau, but were borrowed, and taken over by the Aztecs together with the ready-made book. On the other hand, if they were the inventors of the almanac it would pass comprehension why the Aztecs, having originally come from the north, should not have selected some of the most obvious, and most impressive northern animals, as, for instance, the wolf, bear, puma, and bison, all of which live, or lived, in the north-west.

It is most suggestive that Quetzalcoatl, the Morning Star, the reputed inventor of this almanac, and chief god of the Toltecs and Mayas, was a prominent god in the almanacs used by the Aztecs, whilst their own tutelary god, the god of war, Huitzilopochtli, has no place in it! This fact alone seems sufficient to rule them out as the possible inventors of this unique almanac. How have its inventors arrived at the numbers 20 and 13? The number 20 is obvious; they all counted by scores—*i.e.*, the ten fingers and ten toes. But the origin of the number 13 has been puzzled out by Foerstemann, who has done so much to elucidate the arithmetics and cipher-writings of the Central American peoples. Eight years of three hundred and sixty-five days each are exactly five Venus years of five hundred and eighty-four days; either sum being 2,920 days, and the Central Americans worshipped and

observed the morning and evening star. Now, 5 + 8 are 13, which, multiplied by the usual score, give 260 days of the tonalamatl, which consequently is based upon a combination of the terrestrial and Venus years.

Further, the Central Americans had a civil calendar, a year of three hundred and sixty-five days, but they did not know the leap year. As the tonalamatl began anew after every two hundred and sixty days, it completed its circuit, so to speak, within the year, and overlapped into the next year by one hundred and five days. Each year seems to have been named after that tonalamatl day which happened to fall on the day which they fixed upon as the New Year's Day, and, further, it so happens that the tonalamatl has to complete its circuit seventy-three times before New Year's Day (or any other fixed day of the year) can fall in with the same sign and the same numeral. Further, 73 × 260 days = 18,980 days, or exactly fifty-two years, omitting the correction of leap years. Since they had not hit upon this latter invention, their New Year's Day fell further and further behind the real time, nearly a fortnight in every cycle of fifty-two years, and hence they were in an incessant muddle, and always trying to make their feasts tally with the actual seasons, therefore the people in Mexico occasionally shifted their New Year's Day. When these occasional shifts were made is unknown; and it is equally regrettable that the various nations did not shift alike, and therefore had different New Year's Days. Consequently, none of the numerous dates can be determined. The astronomers made bundles of fifty-two years each, and then the whole reckoning began anew. If they had numbered, or otherwise distinguished, these bundles, we should be able to reckon back easily.

Thus far the builders of the prehistoric monuments in Mexico had got with their science, but whilst the much later Mexican Empire sank into hopeless confusion, the Mayas beyond the Isthmus had given up the counting of years altogether, and reckoned their chronologies by days alone, using as multiples some of the units of the tonalamatl and of the civil year. The latter was divided into eighteen scores

plus five odd, or supplementary, days. Thus they arrived at 18 × 20 = 360. The next higher unit was 360 × 20 = 7,200 days, and this is, as Seler has found out, the length of a "katun." Each katun was named for some unknown reason only after the flower-sign of the twenty day-signs, each of which had the usual thirteen days in the tonalamatl. Consequently there were in all 13 × 20 = 260 katuns possible without repetition in a period which comprised the enormous sum of 1,872,000 days = 5,200 units of 360 days, *i.e.*, about 5,125 terrestrial years, allowing roughly for leap years. This big total was divided into cycles of 20 katuns, and there were 13 such cycles possible. The number 400, a score of scores, is still a popular way of expressing something very big in numbers. Zapotecs will tell you that the giant agave, the *Furcroya*, blooms only once in four hundred years, and even Spanish-speaking Mexicans will swear "by four hundred devils." They have learnt this from the Indians, since the Portuguese and Spaniards of Europe swear by six hundred, as did the Romans. They could, of course, exhaust a few cycles of 20 katuns, *i.e.*, 20 × 20 × 360 = 144,000 days, about 394 years, but not thirteen such cycles.

Foerstemann's genius has found out that the zero of the whole reckoning-system refers to a day which in this almost perpetual calendar is a 4 Ahau Katun, which began with the eighth day of the score, called Kumku, and this has therefore been called the normal, or zero-date; in the Mexican tonalamatl it is "4 xochitl," or "4 flower" ("ahau" being the Maya for flower).

On the monuments of Palenque, in Tabasco, Copan, and Quirigua, in Guatemala, and elsewhere, are sculptured elaborate sums *with a tonalamatl date below them.* With infinite trouble and ingenuity many of these inscriptions have now been deciphered, with the surprising result that the sum total of such sums equals exactly the number of days by which *the actual date* is distant from the normal-date! No. II. of Palenque carries the date 1 Ahau 13 Mac, and the following elaborate calculation therewith—

1 × 20 × 20 × 360	
18 × 20 × 360	
5 × 360	
(?) 4 × 20	
Total ..	275,480 days,

equal to the number of days by which the date 1 Ahau 13 Mac is distant from the normal-date 4 Ahau 8 Kumku.

Obviously, this monument seems to commemorate an exact date in the 755th year of their era; but, unfortunately, nobody knows when that era began, and what its beginning refers to. At any rate, we now know that all these long inscriptions on the Maya monuments are dates, and nothing but dates. Some of the sums are very large indeed. According to Foerstemann, most of those of Quirigua and Copan lie somewhere between 1,360,000 and 1,382,000 days from zero, and if the few experts in these matters are right in guessing that these monuments belong to about the fifteenth century of our own era, then the Maya zero would be somewhere near B.C. 2300.

The Stele C of Quirigua is supposed to be one of the oldest monuments, to judge from its date-sums, which amount to about 3,548 years. If this monument be rightly referred to about the year A.D. 1000, bold reckoning would bring the zero to B.C. 2500. It is not impossible that this zero refers to a real event, but it is most unlikely. First, because it would imply that this superior way of counting had been in existence several thousand years without the builders of the marvellous monuments in Mexico knowing anything about it, although they had exactly the same tonalamatl. Secondly, there is a great discrepancy to be observed; for whilst the Quirigua and Copan monuments present sums of more than 3,000 years, those of the Palenque temples show sums of only 754, to perhaps 1,136, years. This enormous stretch of time, of about 2,400 years, thus happens to be without any dated monuments, and it would be nonsense to believe that those of Palenque are so much older. Every expert agrees that all the Central American ruins belong to very much the same kind of civilisation.

The deciphering of the Palenque monuments happens to be the least successful. Seler has made the following guesses: Altar plate of the Sun Temple, 275,466 days; cross, Temple No. II., 275,480 days; and he considers these two dates as safely solved. The readings of Cross Temple No. I. are very uncertain, either 339,200, or 411,560 days. Lastly, for the palace stairs he gives 1,357,100 days, a sum which would take them exactly within the dates of the Copan monuments, but nobody is likely to attribute to Palenque a period which lasted 3,000 years. Instead of this, I look upon the discrepancies of dates as a sign that during the Palenque period the chronological reckoning itself was shifted, perhaps in this way that the New Year's Day had been altered to bring it more into agreement with actual astronomical conditions. Seler himself tells us that at the time of the Spanish conquest the New Year's Day of the Mayas no longer corresponded with that of the monuments, having been shifted (if I understand him rightly) by 1 + 5 days. As it is not known when this shift took place, there is no chance of reconciling the old perpetual calendar with our own reckoning, and no possibility of finding out the time to which their normal date or zero refers. Foerstemann has come to the conclusion that the normal date refers to the time when the New Year's Day fell upon the 28th of June. That would mean the year about B.C. 1100; the annual precession being 50.21 arc seconds = 200.84 time seconds; seven days being 604,800 seconds; consequently 3,011.3 years. But, as the whole total for the normal date amounts to 1,872,000 days, or about 5,125 terrestrial years, this 28th of June solstice does not help us. However, I think something else may be made of the shifting solstice. I suggest that the discrepancy in the date of—

The Palenque Staircase	..	1,357,100 days
And Palenque Temple No. II.		275,466 ,,
		1,081,634 ,,

can be satisfactorily reduced by the assumption that during the building of the various monuments of Palenque a correctional shift of six days of the solstice was applied. Six

days mean about 2581.1 years, or, roughly, 942,700 days, which, by subtraction, reduce the Palenque difference from much more than a million to about 138,900 days, or 383 years, instead of the incredible 2,800 years. Having thus brought the Palenque monuments well within the period of those of Quirigua and Copan, I venture to make a further suggestion. The key to the whole is represented by the so-called Stele C of Quirigua, which is the oldest of all the dated monuments hitherto known. Seler has read the inscription on the east side of this monument as follows :—

13 × 20 × 20 × 360 (cycles of 400 tuns.)
0 × 20 × 360 (katuns of 20 tuns.)
0 × 360 (tuns of 18 × 20.)
0 × 20 (uinals of 20 days.)
0 × 1

Dated 4 Ahau 8 Kumku.

His only comment is that this inscription means : " This is a chronological monument ; the beginning of the reckoning is the day 4 Ahau 8 Kumku." I suggest that it means much more. That it is intended to set forth the whole mode of calculation within the possible sum total of days, here written on the top line. " From the beginning of time to the end when the thirteen cycles are fulfilled there will be 1,872,000 days. On the other, west, side of this monument, is the date of its erection, and you can read the time by this key." Whether the end refers to the day of doom, the end of time, or of all things, we know not. But I imagine that the big sum represented to them, so to speak, the available sum total of days in the Bank of Time, against which they drew, that, in fact, they " played up " to that sum before them. Further, that they considered themselves in the tenth of the possible thirteen cycles, the nine past cycles being those nine pairs of hieroglyphics which are engraved on the east side of this Stele C, beside the " key," and which Seler has already supposed to mean " larger periods of time."

Of course, all this is mere guesswork by one who does not pretend to the slightest experience in such matters ; but let us see how the application of this unprofessional idea may work

out. Let us, with the experts, assign to the Quirigua monument the year A.D. 1000 The date and sum on its west side is said to give 3,570 years. The complete time-bill of about 5,125 years would then still be 1,555 years ahead, corresponding with the year 2,555 of our own era, and the hypothetical zero would be B.C. 2,570. The palace stairs of Palenque are (by the same method of reckoning) 148 years later. Stele K, of Quirigua, is 350 years later ; Temple No. II. of Palenque (new style of reckoning, allowing a shift of six days due to precession) would be $5{,}125 - (754 + 380) = 3{,}991$ years, corresponding with the year A.D. 1421. But Temple No. I. of Palenque which, provided it can be read at all, is either 175 or 372 years later than Temple No. II., would with this calculation fall into the years A.D. 1596 or 1793 respectively, which would make nonsense. However, if we want to bring these Palenque monuments into line with the rest, the fault in this method of calculation would simply lie with the quite arbitrary assignment of Stele C to the year A.D. 1000. There is no reason whatever why this should not be put back several hundred years. For the sake of corresponding numbers in the years on the monuments and our own era, let us fix the zero at the round figure of B.C. 2900 ; then the Quirigua Stele C was erected in our year A.D. 648. For the sake of easier comparison, the units and tens of the monument numbers have been made to correspond with those of our era, leaving only the hundreds to be adjusted.

Lastly comes the most important question of all. What is the zero ? Again I take Stele C of Quirigua as the key to the whole question. The date and sum on the west side of this monument is as follows, according to Seler :—

$$\begin{aligned} 9 \times 20 \times 20 \times 360 \\ 1 \times 20 \times 360 \\ 0 \times 360 \\ 0 \times 20 \\ 0 \times 1 \end{aligned}$$

Dated 6 Ahau 13 Yaxkin.

That is to say, 1,303,200 days, or, as it is generally put down, 3,570 terrestrial years and 150 days ; but in this sum are about

857 leap years, and the correct sum is 3,567 years + 288 days. Further, the monument was erected when the ninth cycle was already passed by 20 × 360 days; consequently the zero, or beginning of the tenth cycle, gives 3,548 years. Why, then, did the erectors of this key-monument consider their world to be already 3,548 years old? I suggest that this was because they fixed its origin at ten times as many "years" back as their year had days, namely, 10 × 360 = 3,600 of their short years, which equal 3,548 terrestrial years! Further, nine full cycles of 144,000 days each would have exactly the same effect, and, for reasons known to themselves alone, their cosmogony had just done with the ninth cycle. That is all, and that is a great deal.

There are two remarkable coincidences in the appended table. First, for the sake of round numbers the beginning of our era has been made to correspond with the monument's reckoning of 2,900, putting the Quirigua key into our seventh century (to allow the last Palenque of 4,371 to remain well within the time before the conquest), and making the number of years within the problematic century to correspond. Then the date 648 happens to be the same which some authorities, upon grounds unknown to me, have assigned to the arrival of the fabulous Toltecs upon the Mexican plateau (Seler does not accept this date, but assumes 752). Secondly, if, as I assume, a great shifting of the New Year's Day has taken place, this must obviously have been done after the year 998 and before 1099, and within this century falls the year 1051, in which, according to some authorities, the Toltecs are supposed to have left the plateau! This brings us at last back to our original theme, the Toltecs. Why they should have cleared out of the plateau about one hundred years before the arrival of the Nahoa tribes, and one hundred and fifty before that of the Aztecs, is not clear. But if they left so early it explains why their Teotihuacan was already deserted long before the Mexican *régime*. In no case can the Toltecs, after their retreat to Guatemala and Yucatan, have had anything to do with the Quirigua and Copan buildings, but it is just possible that they arrived in time for Temple No. II. of Palenque. But it is

most unlikely that they were the builders of Palenque, witness the date of the palace stairs. We might compare these expelled Toltecs with the Moors who, after the loss of Cordoba and Sevilla, rose again to a short-lived splendour at Granada, but that the conditions were different. The Moors were simply restricted to the last province of Spain and, at Granada, were still amongst their own people, whilst the Toltecs arrived in Yucatan and Guatemala, where they were not wanted, the best available parts of the country being already occupied by a kindred race with a still higher civilisation. They were therefore in the same condition as the Moors after their expulsion from Granada, when, although highly civilised, they were forced back upon their kindred in Africa, whence they had come hundreds of years before; but they were not wanted, and therefore they vanished as an historical unit.

Anno Domini.	End of the last Cycle.		
2225	5125		
1520	....	....	Conquest of Mexico by Cortez
1471	4371	Temple I. of Palenque (Doubtful).	
1427	....	....	Foundation of the Mexican Empire.
1325	....	....	Foundation of Tenochtitlan.
1274	4174	Temple I. of Palenque (Alternative).	
1168	....	....	AZTECS arrive on the plateau and send the other Nahuatlaca tribes away.
1099	3999	Temple II. of Palenque.	
1051	....	....	According to some assumption the TOLTECS leave the plateau.
			Correction of the New Year's Day by excalation of six days
998	3898	Stele K of Quirigua.	
951	3851	,, D of Copan.	
841	3741	,, P of Copan.	
756	3656	Palace stairs of Palenque.	

Anno Domini.	End of the last Cycle.		
648	3548	Stele C of Quirigua ..	According to some assumption the TOLTECS arrive on the plateau.
513	3413	The dated Nephrite Plate.	
*** 2900 B.C.	Zero, first year of first Cycle, dated 4 Ahau 8 Kumku		

Synchronological table of Central American monuments and events, the zero of the native reckoning being assumed to be the year 2900 B.C.

The Toltecs were of a race akin to that of the Mayas, and had a fundamentally similar civilisation, though not so advanced as that of the Mayas themselves. Whilst they occupied Mexico proper they built all those fine monuments, they had the tonalamatl, and they wrote in the form of pictures; but the Mayas improved upon their calculation of time and upon their mode of writing. The Toltecan, therefore, represents an earlier stage of civilisation, though it does not at all follow (as some will have it) that they conveyed it to the Mayas. The Mexican Empire inherited their whole civilisation from the Toltecs, partly from those that remained behind, and partly through contact by commerce, etc.

The Aztec writing was entirely picture writing, and was only just approaching the phonetic stage at the time of the Spanish conquest. They never wrote any texts. They painted, mostly in colours, chronological events, dates, accounts, and, above all, names. The hieroglyphs are very much like a rebus, pictures conveying the intended sense either by direct symbols or by the sound of the object drawn, regardless of the original meaning of the sign; often very much like a punning rebus. "Tl" is the article; "etl" is the bean, a white little oval in a black field, hence *e*; "otli" means the road, hence yellow ground with human footmarks stands for

o ; " atl " is the water, therefore *a* is represented by blue waves with white snail-shells. These shells throw an important light upon the origin of this writing. Without exception they are shells like *Conus* and *Cypræa*, that is, marine shells. The inventors of this sign were people familiar with the sea-coast, and, moreover, this was the Atlantic coast where such shells are large and abundant, while they are small and comparatively rare on the coast of Oaxaca and Guerrero.

A few instances of place-names may explain this curious system of combined idiograph and sound-writing .* Cuernavaca is the Spanish corruption of the Aztec " cuaunahuac " ; " cuautl "—tree ; " nahuac "—near by. The tree sign is simple, invariably painted green with three leaved branches ; " near " is ingenious ; people who can speak our language, or a similar dialect, are neighbours ; or, if you prefer it, our neighbours alone can speak, while foreigners are those who cannot speak. The Russians, for instance, call the Germans " Niemetz "—literally, " mute ones ! " Hence a picture of " mouth and tongue " is a sign for " near by " ; " cuaunahuac " —near the forest. " Cuautla," originally " cuauhtlan "—trees close together, abundance of trees. Teeth stand close together, and a tooth is " tlantli." Therefore the sound " tlan," or the syllable " tlan," is represented by the two front teeth shown in white, with part of the red gums. Exactly the same train of thought leads from " dens," *tooth*, in Latin, to " dense " !

Another remarkable point. Whilst the Mexicans painted their hieroglyphs elaborately, in the case of creatures, for instance, the whole head, the same sign in the Maya tonalamatl is often reduced to a well-nigh irrecognisable bit of the original, but this bit, when explained, is at once recognised as *the* characteristic point. For instance, instead of the whole jaguar's head the Maya sign gives nothing but the ear outline, with its characteristic black spot. Further, the Aztec Empire had no symbols for their numerals, except for certain higher units such as 20, and its multiples, etc. One was a little circle

* See the hieroglyphs of place-names at the end of various chapters.

with a dot in it, 5 was represented by five such circles in a row, and 13 by thirteen such circles, and so forth, in very clumsy fashion. But on the Xochicalco pyramid, on Zapoteca monuments, and in those tonalamatl which were used in Oaxaca and southwards, the number 5 is always represented by a bundle, 10 by two such bundles. Lastly, amongst the Mayas, with their abbreviated writing, the cypher 5 is simply a stick, the cypher 10 two sticks.

All this is a little chapter preaching evolution. The people, who invented the tonalamatl and the hieroglyphic writing, lived in the Atlantic tropical lowlands, not on the Mexican plateau. These intelligent people were Mayas, who were already advanced enough in the seventh century to construct some of those marvellous carved monuments in Guatemala. A branch of these people occupied the Gulf countries, the present State of Vera Cruz, northwards into Tamaulipas (the natives, Huasteka, of this State are known to be closely akin to the present Mayas); and from these lowlands they spread westwards on to the plateau, at least as far as the Valley of Mexico, and it was they who erected all the prehistoric monuments at Teotihuacan, Xochicalco, Cholula, etc., and, of course, those in the State of Vera Cruz. These people were the mysterious Toltecs. Their empire was bordered to the north, west, and south by a broad belt which was, and, with a gap consisting of western Guerrero and Morelos, still is inhabited in the north by the Otomi, in the west by the Tarascos, and in the south by the great Misteca-Zapoteca family. The north-west of Mexico was inhabited by the Nahoa family, merging northwards into the North American tribes. The affinities of the Otomi, Tarasco, and Misteca-Zapoteca to the great Maya stock are not at all clear; there may be no kinship between them, and they may, with the Mixe and Zcque, form a kind of pre-Mayan aborigines. Tarascos and Otomi are possibly related; the peculiar pre-Aztec local names, such as Querétaro, Pátzcuaro, Tacámbaro, Apúndaro, seem to indicate this. The language of the very intelligent Tarascos seems never to have been studied in earnest. But that the Otomi are related to the Misteca-Zapoteca

family has been shown recently.* For our present purpose it is important that some tribes of the latter family—namely, the Misteca, and, above all, the Zapoteca—were capable of the same high civilisation as the Toltecs, witness Mitla and Monte Alban. The Toltecs flourished in Mexico until the Nahoa tribes, having come along the Pacific coastlands, broke through between the Tarascos and Misteca, and then appeared upon the plateau. By the time that the Aztecs had settled in the Valley of Mexico the majority of the Toltecs had gone to whence they had come. The Aztecs, the most intelligent of all the Nahoa tribes, had a gift for administration, and, above all, were a warlike race, somewhat like the Romans. It came to pass that all the Nahoa tribes became known as Mejica, and, overrunning the Toltec dominion, they inherited their science and art to a certain extent, but even at the time of the Spanish conquest they had made but little headway against the Zapoteca, the most intellectual of all the many tribes in the whole of the Mexican Republic.

Much confused matter has been written about the languages which are spoken in Mexico, and there seems to be a bewildering number of them, whilst many have died out, or are vanishing without having been recorded. Some authorities group the hundred and odd so-called languages into a dozen or a score of families, and fight over whether they are, and if so, which of them are, monosyllabic, agglutinative, incorporative, polysynthetic, or inflexional. A considerable clearing up of this chaos is being achieved by Sr. Lic. Don Francisco Belmar, till recently Secretary of State in Oaxaca. He himself speaks a number of these languages, and has followed up their dialects in daily intercourse with the people. Thus it has come to pass that differences, which to the bookworm philologist seem fundamental, are to him but variations of one great theme, the linguistic peculiarities of some tribe or other always filling the gap ; in other words, the genius of these languages has been revealed to him. Instead of increasing the chaos by incessant splitting up of the groups, he connects the languages, reducing

* F. Belmar, "Lenguas indigenas de Mexico." Mexico, 1905.

them to a few groups, and even these he is on a fair way to combining. One of his latest achievements has been to show that the Otomi is akin to the Zapoteca group. This is of the utmost importance. Hitherto the Otomi, still spoken exclusively in the centre, has been considered a monosyllabic language, and therefore primitive, and therefore again—it sounds almost incredible—attempts have not been wanting to connect it with Chinese!

Every language has started with monosyllabic words, and every language has retained such words, some many, others few, and many of such syllables have lost their independent meaning, although they at once impart a special meaning when attached to other sounds; for instance, our own "be" or "un" in "become" and "undo." No language is known which is still primitively monosyllabic, and those which approach that condition have done so through a long process of attrition, notably the Anglo-Saxon portion of modern English, and Chinese. These words have been so much clipped, contracted, and used as auxiliaries, that they are now like so many water-worn pebbles, many of them almost alike. "I did not know what to say, but let him cut down for wood all the trees in his reach." Twenty different words, and only twenty syllables! That is a greater feat than is within the scope of even the so-called monosyllabic Otomi.

All the American languages are said to be incorporative and agglutinative, and none are inflexional. The differences between quasi-monosyllabic, simply juxtaposed, synthetic, and polysynthetic languages, are only differences of degree, and vanish when put to the test. However, the various authorities have not yet agreed upon reliable definitions of these terms, for the good reason that there are no fundamental differences in practice. "Son" is monosyllabic; "grandson" is synthetic; the "never-to-be-forgotten grandfather" is polysynthetic in the fullest sense, since "the whole combination is firmly welded together and presents a whole sentence, or proposition, in the guise of one word." The Aztec language is fond of such formations, hence it is polysynthetic. The Zapotec has little of it, others have still less or none.

Sr. Belmar has shown that the further the respective languages have been developed the more the Mexican languages tend to form compound words, and he has followed up this process very elaborately in the various languages of the Misteca-Zapoteca group. Frequently the words of two syllables are formed of two roots, each of which originally meant the same thing, and each of which in some language or other is still used as the sole term for that thing. If "tree" in one language is called *A* and in another *B*, then in Zapoteca a tree is called *A* + *B*. I think that the same notion, the desire for greater precision, and the desire also to obviate mistakes in the pronunciation of the mostly monosyllabic roots (there are, for instance, thirteen different *koo*, five *kee*, three *kii*, ten *kua*, five *kue* in Belmar's short Zapotec vocabulary) has, perhaps, led also to the frequent use of categorical terms, or general, combined with specific, terms, something like "beast-cat," "beast-dog," just as it might occasionally serve to prevent confusion if we said "doe-beast" and "dough-mass." Some of the languages use more suffixes, others more prefixes. Some say "in-my-house," others "my-house-in"; some say "past-I-sing," others "I sing-past," meaning, in either case, "I have sung."

The various languages do not coincide with natural boundaries. They are in scattered groups, or mixed and form "enclaves," thus indicating the shifting, overlapping, and penetration that has gone on in the past. Moreover, there are very many dialects, and these change so easily and rapidly that no great geographical obstacles are necessary to bring about an estrangement. For instance, between Oaxaca and the coast almost every village has its own Zapotec dialect, not only as regards pronunciation, but even in respect of the difference of words. Another powerful illustration is afforded by the four Huavi villages, which are said to understand each other with some difficulty; though separated only by the lagoons, and almost within sight of each other, the mere absence of daily intercourse is sufficient for these changes. The same principle applies to the language, and it must be remembered that none of these tribes and nations possessed a written language. Only

those who had developed a central government, who administered and traded, and especially those who attained to military power, have spread, and to a certain extent have fixed, their speech. None show this more clearly than the Mejicanos. Yet even this military race has not been able to impress its avowedly highly developed language upon any of the other tribes and nations. Many have vanished, but none seem to have adopted another native language. Not so with Spanish, which, although so absolutely foreign in grammar and syntax to their own form of thought, is becoming the dominant idiom, simply owing to the strength of the immeasurably superior civilisation which backs it, and because the Government, instead of worrying, lets the natives talk as much as, and in whatever tongue, they like.

It would be a great error to conclude that these languages are still in their infancy, because they are so plastic, are not fixed, and to some extent are still monosyllabic. If they can all be reduced to a few fundamental groups which are irreconcilable, then it follows either that the country received its population at various times and from different stocks, or that America was once inhabited by speechless man. As many other large mammals have spread from the Old into the New World, man may have done the same by way of Alaska before he reached the stage of so-called articulate speech, and that of using implements. Ethnologists tell us that all the American aborigines are closely akin to each other, forming one large family, with essentially the same fundamental characters, and that by speech and physical features they reveal themselves to be of Mongolian stock. Unless we assume a multiple origin of mankind, this seems, after all, the most reasonable supposition.

The question has cropped up with great persistence whether the builders of the monuments in Central America and Peru were people who, without affinities with the other tribes of North and South America, have immigrated more directly and more recently from some Indo-Chinese country. This idea has found enthusiastic advocates and no less scornful refutation; yet it is far from settled. Reasons in favour of

it are the following :—First, the style of the square pyramidal buildings. To think here of Egyptian influence is childish. Tumuli are either round, or they are sure to assume a square shape, with reference to the four quarters of the world, when sun worship and astronomical knowledge are developed, both of which are inherent elements in human nature. Secondly : the occurrence of so many implements and ornaments of jade and nephrite, which is not known to occur in America except in Alaska, though found in New Zealand and in Eastern Asia. Small implements can be traded thousands of miles over land, but this would scarcely be the case with pieces in the rough, to be carved by the buyer. Thirdly : some of the terra-cotta images have unmistakably slanting "Mongolian" eyes. Professor Starr states that "oblique eyes, like those of the Chinese, are frequent in some tribes, but are not universal in any ; a less degree of obliquity occurs quite commonly in some tribes." Of course, this may be due to a remnant of the problematic Mongolian immigrants, who must have existed in Central America in considerable numbers. There are, further, the pig-tailed people carved in relief on the slabs of the subterranean passages of Monte Alban, see p. 258. Neatly carved figures have been dug up in Mexico City which some experts declare to be of Chinese make. Lastly, and this is a point which I cannot get over : at Uxmal is said to be the carved image of the head of an elephant, as clearly delineated as it can have been done only by an artist who was familiar with these creatures. American palæontologists, amongst them no less an authority than Professor W. B. Scott, of Princeton, hold that the mammoth in America was contemporary with man, but the Palenque creature is not a mammoth, and, moreover, that would put those stone carvings with their complicated sums back to the age of primitive man. Accomplished sculptors, mathematicians, and mammoths do not go well together.

The whole question has not been solved : far from it. It cannot be disposed of by ridiculing everyone of the arguments adduced, though none of them amount to actual proof, and by simply explaining the resemblances as cases of accidental con-

vergence. None of the American races were, or are, navigators, and yet there are huge carved stones on Easter Island, a little speck in the ocean, 2,000 miles off Chile, and not known to have been inhabited at all, except for these silent witnesses of the mysterious navigators of the great ocean.

A MODERN AZTEC BOY.

CHAPTER XVI.

IGUALA AND THE RIO BALSAS.

A beautiful Defile—Inn and Market of Iguala—The Railhead—The Balsas River—Tree-frogs—The *Chirotes* Lizard—Gold—Disagreeable Experiences.

There is not much in Iguala conducive to a stay, unless the traveller be preparing to follow the ancient trail to Chilpancingo and Acapulco. The town lies in the midst of a large, uninteresting plain, which is reached by rail from the north through the Cañon de la Mano. This gorge, cleaving the range of limestone hills from north to south, is only some four miles from the town, and is itself about as many miles long. In wild, picturesque, luxurious beauty it is not easily surpassed. We spent a whole day in it, revelling in its beauty; in the high precipitous crags, every yard overgrown with trees, flowers, ferns, and creepers; and the stream rushing through its bed of boulders, where the leisured observer is sure to see plenty of life. Myriads of butterflies, lizards, snakes, birds, and various mammals, such as the "tejon," the "cacomistle," squirrels, and opossums, are to be seen, and even the jaguar, who pays visits during his nightly prowls to the high trestle railway bridge, which itself is a fine piece of engineering skill and daring. Mostly, tourists keep to certain well-beaten tracks, but always enquire whether there is anything else worth seeing without undue exertion.

A visit to the Cañon de la Mano requires no preparations, since, on coming from Iguala one has but to step out of the morning train, have a day's picnic in this most glorious defile, and then either walk back to the town or take the afternoon

down-train. Much touting goes on at the station of Iguala, a long way off the town. The ramshackle omnibus, crowded beyond its last inch of capacity, and drawn by a team of mules, rushes through the filthiest mud at the back of the station, and dives into a pool between ox-carts, loose cattle, braying donkeys, and country Indians, the latter perched up on the stacks of sleepers. Other Indians squat under the shelter of a goods' car, the women busily grinding Indian corn with their lava implements, or roasting tortillas over roughly improvised fires. There are crowds and crowds of these natives, some coming and others going by the train. Many families have established themselves there for good, in their flimsily-built shelters, or stalls, and are driving a flourishing trade with "mescal," bits of sugar-cane, cigarettes, tortillas, and dulces. or sweetmeats, of many kinds and colours. Here and there stands a table with extemporised seats, where one can partake *al fresco* of a meal consisting of a nauseous-looking soup, a dish of black beans swimming in a brown oily-looking fluid, and "chili con carne," the national red-pepper and meat stew.

The omnibus drags on over the fields, through sand and mud, passes the high-walled cemetery, enters the long, straggling lanes of the town, and then bumps over the stones of a curious pavement. For some unknown reason, unless it be that of economy, the roads in the outskirts of many of these towns are only half paved. Say one hundred yards of the right. then the next hundred yards of the left are paved, both sides sloping towards the centre which forms the gutter. The stones at the edges of these strips of pavement are, of course, loose, dislodged by wheels and rain, and the state of the road where these opposite pavements meet can be imagined. Within the town proper the streets are all right, barring the slope, and we gallop along at a furious pace. The town itself is fairly clean, the fruit market, pottery, and the whole life of the town is typically semi-tropical.

The Hotel Cortina was dirty, and some of its rooms quite impossible, but the food was good and ample, as it was run entirely by women. Never-failing amusement was afforded

by a parrot, which soon let out a little secret. The name of the chief maid was Luz, or "Light," and she was much in request. There were frequent calls for "Luz," every one of which was promptly answered by the "Perrico" in the "Light's" voice, with the words "Ya la traigo,"—"I am bringing it already," but Luz herself being usually elsewhere did not appear.

YOUNG LADY AND MAID SHOPPING AT IGUALA.

Iguala is the "jumping-off" place for Acapulco. Riding-horses and pack-trains are fitted out at this town, and the traveller who might try to vary this immemorial custom would soon find himself in difficulties. It was our intention first to go by rail to the Rio Balsas station, and then return to Iguala, thence taking up the trail to the south. The Jefe Politico, whose business it was to make the arrangements, procured instead a letter from a man who was supposed to be all-powerful at the Balsas, and who just happened to pass through the town.

The letter was profuse, and promised horses, mules, and good guides at Balsas, to take us thence the dozen miles up river to Mescala, and then southwards. The proposal sounded attractive, as the return journey by rail would thereby be avoided as also the march from Iguala to Mescala, which place we should have to pass in any case. We fell into this trap.

It is three hours by rail to Balsas station, where we arrived at half-past ten at night, having been joined on the way by one Daniel, who, as the bailiff and right-hand of his master, laid the whole village, with all its resources, at our feet, and installed us at the empty "casa grande," with Pascual, a native, to act as servant and guard. Rio Balsas is a queer-looking place; it is at present the terminus of the railway, which was built, by private enterprise, from Cuernavaca southwards; it was, indeed, well enough built, but at the Balsas it got itself into a *cul-de-sac*, whence it is not likely to be extricated in a hurry. The river is spanned by a fine iron bridge right in front of impassable mountains. Thus it has come to pass that the terminus of this line is a bridge which cannot be used even for ordinary traffic, since only men and dogs can hop over the trestles, and even they only on sufferance. There was originally no settlement of natives, but all sorts and conditions of men, that indescribable riff-raff which collects along a new railroad in a wilderness, had stuck there, and these were mostly Indians of various tribes. There is nothing to trade with, the chief industry being the cutting down of the scrubby trees, mainly the red-barked "mulato"-tree, to supply fuel for the engines on the line. Our self-appointed patron was the contractor for the firewood company; the place practically belonged to him. The wood is brought there by donkeys, and then across the bridge on men's backs.

Imagine some dozen palm-thatched huts, scattered about without rhyme or reason in the sloping corner, which is formed by the mighty Balsas and its tributary the Cocula. This river is crossed by a rope ferry, consisting of a wire rope which starts out of a tree on the opposite side. Passengers and goods are put into a kind of crate and then hauled across, not without interruptions, as—if the passenger is a stranger—the con-

trivance is made to stop half-way to allow him the better to enjoy the view of the swirling river beneath, and the ferryman takes advantage of the situation to drive a better bargain. The craggy mountains are well covered with tropical growth, all very pretty, were it not for the presence of mankind. Our own domicile, the best in the village, is worth describing. It was a large, oblong, lofty hut, with wattled walls, and with a central roof-ridge supporting a roof of palm-leaves, forming

FERRY ACROSS THE COCULA RIVER.

eaves, and had in front the usual verandah. At front and back it had doors; the floor was made of beaten clay mixed with cows' dung, and it had an office table and two "catres," the usual wooden folding bedstead frames held together by canvas. Bottles, saddles, chains, ropes, and dirt made up the furniture. If you arrive at such a place in utter darkness, with your camping equipment and all the other many bundles piled up on the floor, you sit down on the top of your possessions while the usual nocturnal thunderstorm is raging, soaked with

perspiration and by the rain, and wish yourself elsewhere. However, you cannot sit there all night. Let us light candles and make ourselves at home. Then come forth moths, beetles, and mosquitoes, flies, midges, and untold similar horrors, all buzzing, biting, tickling, and irritating, while roof, walls, and floor are alive with other abominations, such as scorpions, centipedes, bugs, and fleas. At last you creep under the mosquito curtains of the camp beds, but sleep is impossible in the stuffy atmosphere—temperature 86° F., and laden with moisture. The dogs keep up an incessant bark, donkeys bray,

OUR HOUSE AT BALSAS.
(South Entrance.)

pigs squeal, and men drunk with "mescal" continue to brawl, and keep on droning their weird, monotonous songs. Toads sit in the little puddles under the dripping eaves, and cry like babies, or bleat like little goats, while the tree-frogs contribute to the din with their incessant, bark-like staccato, their cry sounding like a cross between that of an angry puppy and a snarling dog. But even amidst all this din you succumb at last to the sleep of exhaustion, soon stirred up by the discovery that the beds have been put exactly under the most leaky part of the roof, and require shifting.

As usual, the morning hours were the best part of the day, but soon it became hot and glaring. Too hot to be about in

the sun from 10 a.m. to 3 p.m., when the temperature, even in the dark, ill-ventilated hut, kept at 96° F.; as long as it kept below 86° we did not much mind, and when it sank to 80°, its lowest, the air seemed quite agreeable. The hut stood close to the bank of the Cocula, and in the dense foliage beyond the fireflies made a wonderful display in the evening, thousands of them flitting about like so many electric sparks, so bright that their

OUR HOUSE AT BALSAS.

reflections could be seen in the water. But usually about 8 p.m. the sky became thick with clouds, soon to burst like a deluge, which kept on till after midnight.

The extent of these rains, or rather, their detailed distribution in space and time during the wet season, seemed to be rather erratic. For instance, the Cocula at our back door rose many feet overnight, and was then for hours covered with a mass of mould, dried grass, branches, trees, and hut-roofs, mixed with scum and foam, all rushing into the Balsas. This

river, one of the largest in Mexico, fell during our stay of four days as many feet, indicating that in the region of its eastern basin the rains had temporarily stopped, but about the conditions to the south we could learn nothing. The Balsas has many names, since it is the custom of the natives to refer to a river by the name of the nearest settlement, unless they speak of it only as "the river." From its mouth upwards it is the Zacatula, Balsas, Mescala, Atoyac.

"Rio de las Balsas" refers to the "balsas," or rafts, by which it is crossed or, to a limited extent, navigated. Often such a raft consists of but two logs lashed together, with a bundle of Indian corn-stalks on the top, and with a mat which also covers the "goods to be kept dry." The captain and crew, he is all in one, divests himself of all his garments except his big sombrero, sits astride in front, and punts the raft into the current, while the passenger, likewise stripped, is welcome to hold on behind as best he can. For regular voyages between villages, the raft is a bigger one, and the "crew" is—drunk! At the time of our visit the Balsas was full of yellow-brown water, which carried little sand, the turbid water being so full of comminuted vegetable matter that even after several hours standing in a vessel it deposited very little sediment. During the winter (the dry season) this same river shrinks considerably; its rocky bed is then full of sandbanks, and the water is said to be quite clear, with a bluish-green tinge. The banks are high, mostly formed by limestone. The elevation of Balsas Station is returned as 1,417 feet, the river's mean may be 1,390. Between this station and the village of Coyuca, a distance of scarcely seventy miles, it is said there are more than fifty rapids.

The whole valley is notoriously hot and stuffy, and at all times of the year infested with an unusual number of insects. The tropical features of plants and animals are apparent. Crocodiles of moderate size, regularly ascend a little beyond Mescala. There are very few kinds of fish, not more than six species having hitherto been reported from this huge basin. This scarcity is best explained by the abnormal conditions or changes of the water described above, few fishes being adapted

to live in a river which for half a year is turbid, and clear during the other half, without any quiet backwaters. The biggest fish is a kind of sheat-fish (*Amiurus balsanus*), reaching a length of five feet; the man who hauled it out with his primitive tackle belonged to a type very different from that of the majority. Lovely big tree-frogs, of a saturated green, dwelt

A FISHERMAN AT BALSAS.

during the heat of the day in the thick thatch of the huts, whilst at night, especially during the rain, they hopped about on the ground, to pair. As a rule these *Phyllomedusas* do not deposit their spawn directly in the water; they wrap their eggs in a foamy lather, and suspend the whole mass between leaves or grass, over water, in such a position that the next heavy rain washes the rapidly developing eggs or tadpoles into it. Those which we could observe behaved in rather a puzzling manner

The pairs sat in a tangle of herbs at the edge of a little ditch in the middle of the village, whence the rain could wash the eggs only into a filthy lagoon some fifty yards off. In the morning the ditch was always quite dry, and there were no traces of frogs or eggs left. This may have been an error of judgment of the tree-frogs. The majority were barking, snarling, and entreating each other's attention on more suitable ground, but we failed ignominiously in our observations during the dark of night, and in the tropical downpour. The most remarkable feature, so far apparently unique, is the colour of the

Chirotes canaliculatus.
(3 times nat. size.)

numerous and very small eggs, these all being of a light green !

Our reward came in another direction in the guise of "culebritas con manitas," little snakes with little hands sounds quite sufficiently startling ! The creature belongs to the genus *Chirotes*, a member of the widely distributed family of *Amphisbænidæ*, worm-shaped lizards, all of which, except *Chirotes* have lost every trace of the limbs. Only *Chirotes* has kept its front pair, rather strong, with sturdy little digging hands. Discovered many years ago somewhere "in Mexico," it remained after that almost mythical, a treasure in a few

European museums. Then a single specimen with only three fingers was received from near Tecpan in South Guerrero. Next, some twenty years ago, a third kind was discovered in Lower California in considerable numbers. We found the original five-fingered *Chirotes* on the banks of the Balsas, where it lives in the patches of alluvial sandy soil, well out of reach of possible floods. Natives were actually ploughing the fields of Indian corn when they found this treasure. In our hopes of getting many we were, however, disappointed; only three specimens were the spoil, in spite of the promised rewards being increased from day to day. Then Ramon and ourselves went digging until we were completely baked by the fierce sun. The pink, worm-like, blind creatures, of the size and thickness of an ordinary lead pencil, live at a depth of at least one foot, burrowing little canals which may be followed a long way in any direction in the moist sand, but collapse at once behind the digging animal in the drier parts. They do not apparently come to the surface during the night, no tracks being visible in the early morning. When kept in a tin with sand they dug into it first with their heads, then with their mole-like hands. Like other *Amphisbœnas* they soon become flabby from evaporation, but swelled up again when the sand was moistened. *Chirotes*, the least reduced member of the presumably ancient family of *Amphisbœnas*, is their sole representative in Mexico. It is difficult to imagine how it, a helpless digger, without any chance of travelling, bound as it is to sandy soil, has managed to survive, unless we imagine that it is really a coast inhabitant. Living in dunes as it does in Lower California, and at Tecpan, not far inland from Acapulco (most likely also in many other parts of the Pacific coast of Mexico, though accidentally not yet found), it may have worked its way up the many sand-covered ledges of the Balsas, unless, indeed the lower half of its basin once formed a temporary inlet of the sea, an assumption not at all impossible, although unsupported at present, its geological features being unknown. "It is slow but sure that does it." A worm-like creature, provided there was at some time or other continuity of suitable terrain in a west to east direction, it may have spread at the

slow rate of ten feet per year, which means three miles since the beginning of the Christian era, a mere nothing in point of time, but even at this rate of progress the two hundred miles required would be accomplished in 125,000 years. To round off this fanciful calculation to a quarter of a million years, 100,000 years may then be allowed for hitches on the journey,

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such as waiting for sandy patches to join. Idle dreams? Not at all, since our calculations afford an insight into what can be done in time by a slowly-spreading kind of creature. They are at least as satisfactory as the assumption that these *Chirotes* once extended over a much wider area, and are now restricted to a few localities. By-the-bye, I wonder whether Pascual has ever introduced their new name amongst his people.

He asked what we called these "culebritas," and when told he repeated over and over again the word "quirotas." Perhaps some future traveller will analyse this word.

The Balsas basin and the mountains of the western half of Guerrero are the centre of the gold-mining industry of Southern Mexico, or, let us say, of the seeking for gold. There are hundreds of gold-mines, or, rather, places where the white man is searching for the "yellow metal," and every year new little companies are formed, "puffed" into existence, sold, and then abandoned. One cannot travel for a week without receiving the most glowing offer of some mine, or, at least, a mine "en estudio, en su infancia," a mine in contemplation or in its infancy. The curious point is that the lucky owner invariably should be so anxious to get rid of it. Now, what are the facts about this gold in Mexico? I have not yet met a man who has made his fortune out of gold, although I have met some who have made money by selling a mine, and not a few who have lost all they possessed through buying and working one.

There is gold in Guerrero, and it has been washed by the natives from time immemorial. When the Spaniards destroyed the Aztec Empire they found that gold was much used for ornaments, but not even Cortez, who naturally had the pick of these treasures, managed to send home great quantities; nor did any of his soldiers become rich. It has been calculated that the amount of gold squeezed out of Mexico during the first fifty years after the conquest did not average more than a few hundred pounds yearly.*

The Aztecs had a humorously profane name for gold, "tio-cuitl," *i.e.*, "god-excrements." They themselves got it from the tributary tribes, and as gold, when turned into ornaments does not get lost, the accumulation of hundreds of years may easily have reached a considerable amount. Moreover, the chiefs sweated their people, and the Spaniards put on the screw still more tightly, and yet the result was but moderate. Because there is not much gold in placers.

* A. Soetbeer, "Edelmetall Produktion," Gotha, 1879. F. De la Yglesia, "Los Caudales de Indias en la primera mitad del siglo XVI." Madrid, 1904

Why, otherwise, did they waste their energy in sending expedition after expedition further and further to the north-west, only to lose themselves in Texas, New Mexico, and Arizona ?

Much of the western half of the Sierra Madre del Sur is composed of eruptive rocks, granulite and andesite ; some of the peaks are quartzite, with great andesite dykes, and with mica schist on the slopes ; and in some places in contact with the eruptive rocks is a slaty formation, with quartz veins, and these contain gold. But they are difficult to work in the mountain fastnesses, with a very scanty population, and no water for the stamps. Neither natives nor Spaniards seriously wasted their energy in this way. The natives obtained the gold by the same process as they do still, namely, by washing it out of the gravel of the river beds, out of the *débris* of the original quartz veins, which it has taken nature countless ages to crush and to carry down. Every year, just before the rainy season, when the river is at its lowest, natives of Guerrero and Michoacan work in the shallow places and sandbanks for the " dust," and there are even rumours of little nuggets.

A swarthy American, who had " jumped a train " and thus got to the Balsas, attracted general attention by his looking about and restlessly crossing and recrossing the bridge, wanting to buy arms and not knowing any Spanish. A day later he was found near a village lower down, famished and half maddened with the bites and stings of the insects which had attacked him while sleeping in the bush and rain. He was undoubtedly " loco," of unsound mind, and the chief of that village intended to transport him back to us, but as he never turned up and was not heard of again, he was probably despatched in some other way. These Indians are rather jealous of their womenkind, and a white stranger who cannot talk, is unarmed, and penniless, easily meets with a " disgracia," which does not mean a disgrace, but an accident, the idea of blame implied by the term referring either to Fate, God, or any other agency thought likely to be responsible. If " gracia à Dios " means thanks, a " disgracia " is clearly due to an " ungrateful," or rather, a thankless act, such as some carelessness of failure of duty. The decision arrived at by an Indian,

whether he is to propitiate his recalcitrant saint by further offerings or to punish him, is due to a very subtle mental process. Propitiation is tantamount to self-confession on the part of an uneasy conscience.

If it had not been for the interesting fauna, we would gladly have left this hell of dirt, noise, and viciousness a day or two sooner. But this was easier to be said than done. Saturday being pay-day, brought in the contractor on a trolley,

MARKET AT BALSAS.

and our first interview with him seemed to be very satisfactory. He was thanked for his gracious letter, the loan of the house and servant, and for his repeated promise to despatch us with a guide, and any number of horses and mules to Mescala early next morning. But a few hours later everybody had succumbed to the effects of its being pay-day, and it was Sunday afternoon when there at last appeared as impudent a rascal as only a bad muleteer can be, with two sore-backed mules. Daniel himself had taken the precaution of sending his own

horses away, and no other suitable beasts were available. We therefore cursed the whole village jointly and in detail, and resolved to return to Iguala by train, provided that the latter managed to turn up that night. There was much packing and re-arranging of the baggage, which had already been divided into proper loads; by midnight they were safely on board, and we sweltered in the hut in a state of exhaustion till 2.30 a.m., when we got off at last. And whom did we behold in the same car but Daniel, who went as far as the next station, thence personally to take back his horses!

The Prefect of Iguala was not exactly pleased to see us again, and felt uncomfortable when long telegrams from the Governor at Chilpancingo came in, wanting to know what had become of us, and announcing that a whole detachment of mounted police had been waiting for several days at Mescala. Then followed many excuses and explanatory lies, and orderlies bustled about. To make things still more lively three rurales with a sergeant clattered into the town at daybreak in search of us. Within record time horses, mules, and muleteers were found and got ready, and half-a-dozen mounted orderlies formed a guard of honour, in addition to the four rurales, to see us well out of the town.

CHAPTER XVII.

IGUALA TO CHILPANCINGO.

The Rurales—Wholesale Executions—Our New Servant—Scenery between Iguala and the Balsas at Mescala—Mules, Asses, and Horses—The Musk Duck at Home—Bush-fowls—Parrakeets—Crossing the River and Camping at Mescala—A Bad Night—Vegetation—The Cañon del Zopilote—Chilpancingo, the Capital of Guerrero—Market Scenes—The Governor Manuel Guillen, an Appreciation.

Such frequent mention has been made in this narrative of rurales, and they become so integral a part of our expedition, that they deserve more than a few casual remarks. Mexico has long suffered from the reputation of being the land of robbers, bandits, and murderers. Perhaps the people have, or had, a natural gift for these occupations, and as it is usual in countries which have undergone frequent political upheavals, every revolution or civil war leaves in its wake a number of freelances, disbanded soldiers, partisans who have either forgotten the occupations of peace, or who, finding themselves on the wrong side, cannot easily settle down again to law-abiding employment. Things reached a climax when, after the fantastic Maximilian episode and the expulsion of Bazaine's army of occupation, the profession of the soldier offered no further inducements; commerce and agriculture had suffered much, and the most remunerative employment was that of the robber. General Diaz conceived the bright idea of summoning the leaders of such bands to a parley to ask whether they had any objection to gaining a good living in an honest way. If they had not, he would guarantee them a congenial occupation, namely, that of hunting down other

robbers and malcontents, and he promised to pay them regularly and better than any corps in any other country. The bargain was agreed to, and kept on both sides, with the result that Mexico now has a large number of rurales, comparable to the Irish Constabulary, or still more to that splendid corps, the Guardias civiles in Spain. The bandits originally enlisted have by now been replaced by their children and grandchildren, and the corps is so popular that the idea of being a rural does

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not at all imply shady antecedents; on the contrary, the rurales are picked men. The discipline is an iron one; there is a considerable pride of caste, and the members of the corps are absolutely reliable, not the least though, because they know that they themselves would be hunted down ruthlessly by "the other boys" if they themselves did anything wrong. They have a uniform, consisting of a jacket of grey cloth, with blue or red facings, tight-fitting grey trousers, and, the most important part of all, a large grey felt hat. On the right side of the hat are silver-embroidered initials, indicative of

the State, for instance, E° de M^{s}, E° de G^{ro}, Estado de Morelos. or of Guerrero.

There are two kinds of rurales, those of the individual States, and Federals, with S. P. ("Seguridad Publica") on their hats. These latter form one large corps, commanded by a general of their own, and are distributed almost throughout the country in "destacamentos," ready to be despatched to any part where things political are not exactly as they ought to be. State rurales are under the direct control of the State Governor, in whose capital they practically form the body-guard. In the smaller towns they are under the orders of the "jefe politico," or prefect, a person who, to a certain extent, combines the office of commissioner of police with that of a sitting magistrate. The unmarried rurales are lodged in barracks. The accoutrements of a private are not extensive. Most, perhaps the only, care is bestowed upon the sombrero, which has a special waterproof of its own that is at once put on when it threatens to rain. A blanket, or zarape, a "manga de hule," or white indiarubber waterproof sheet with a hole in the centre for the head, a repeating carbine, machete and colossal, heavy and clumsy spurs, complete the outfit. The saddle is of the universal Mexican pattern, very strong, the bare trees with a rather wide space between them, and with the broad stirrup leathers sunk in; the high pommel, for the "riata," or lasso, ends in a broad, flat-topped disc almost invariably adorned with a rim of silver. The stirrups of the country are clumsy things in the form of wooden stirrup-boxes or thick leather shoes, which are made to fit the narrow pointed shoe there in fashion, and have no room for a stout boot. But in spite of its clumsy and heavy appearance, the stirrup-box has great advantages. It protects the foot in many ways; from knocks against rocks, from the bites of vicious mules, keeps the boot dry in the rain, and shades it from the intolerable heat of the sun.

The horses are never ridden on the snaffle, but always on a formidable bit, with short leverage. As a rule the Mexicans are not cruel to their horses; on the contrary, they train them well. We, for instance, never came across a buck-jumper,

nor saw any similar displays of temper. The reins are scarcely used; if pulled up sharply the tender-mouthed horse rears up immediately; it is guided practically by the slightest pressure of the rein against the side of the neck opposite to the direction which it is intended to go. To make a good horse canter it is sufficient to give it the spur and to drop the reins on its neck. Many a saddle-horse does not know the rein at all, but is ridden with a simple noose, or double halter. The big spurs, often weighing several pounds each, with their enormous rowels and long "spikes and bars," seem to the casual observer to be instruments of torture. In reality they are nothing of the kind, but are mostly intended for "swagger." The whole saddle is so firm and unyielding, and there are so many large leather flaps and straps, that no amount of pressure by the rider's legs or thighs would have the slightest effect upon the animal, whose flanks moreover could not be reached without exertion by an ordinary spur, especially if the long-legged rider be mounted on a pony which is the average size of the horse in Mexico.

The rurales when on duty have practically to find everything both for themselves and their horses, consequently there is an entire absence of camping outfit or cooking utensils, let alone knife, fork, or spoon.

The safety of the towns is entrusted to the "guardia municipal," or police proper. As the name implies, the domain of the rurales lies outside the towns; they do not exactly patrol the country as the Guardias civiles do in Spain; their main duty is the hunting down of criminals, and since in this they are, in the end, invariably successful, most of the country is now as safe as, or rather, safer than, many another which boasts of a much older, or more polished, civilisation. What the Guardias civiles have done and are doing for Spain, the rurales have effected in Mexico; but, do away with this force, and the old trouble would prevail again. It is fear, the absolute certainty of being caught, which keeps the people good, and what things are really like in the more remote regions we had ample opportunity of studying on the spot.

There are two crimes which bring death as a retribution —highway robbery and the holding up of trains. Then the rurales are turned loose, and it is their excellent custom to take the captives to the identical spot in which their crime was committed, and then shoot them, after which they are suspended for twenty-four hours. A little cross, or crosses, and a heap of stones forms the only record, and with such the country is well studded. Sometimes these acts of retribution assume alarming proportions.* Witness the following recent incident, which was still a topic of conversation. A Frenchman, travelling with a large sum of money, showed this to a "jefe politico" and enlisted his protection. Instead of giving him a proper escort, this rascal assured the traveller of his safety, but hired some men to waylay, rob, and kill him. The foul deed became known, and a force of rurales soon appeared at the house of the "jefe," asking leave to inspect the contents of his official safe. He had lost the key. Never mind, they would break it open—and they found the missing money. The ferreting out of his accomplices took some time, as they had other helpers, and it became difficult to ascertain accurately who was in this big plot. The knot was cut, little by little, by the execution of twenty-two men, the "jefe" included. Such a diversion has a most wholesome effect, which spreads over a large district, and lasts for many years.

One might easily acquire the preconceived notion that these rurales are, either from inclination or acquired habit, a rough and even bloodthirsty lot. Certainly, familiarity breeds contempt so far as killing is concerned, and we often pondered over the effect of this rough life upon some of our protectors, who still looked mere boys. In the State of Morelos the people have a peculiar sing-song intonation, and it was a treat to hear a rural reporting some disagreeable business in the gentlest of voices and in well-turned phrases, perhaps winding up with the information that "fulano se morioó"—*i.e.*, So-and-so

* Capital punishment has been abolished in the Republic, but this deficiency is compensated by the judicious application of the terrible "Ley fuga" (law concerning flight), according to which, any attempt to escape on the part of the prisoner is to be prevented by force of arms, and real criminals invariably seem to make the attempt.

"died himself." People with much experience have told us that these fellows are the gentlest-mannered, and most mild-spoken of ruffians, and that, like Bombardos in the operetta, " and they'll hang you most politely, most politely." This may be so, but we have seen not a few, have lived with them, and have seen them dealing with unwilling villagers, but they never lost their temper, never got entangled with the women, and, even under most provoking circumstances, never swore a coarse oath, although the Mexican vocabulary is ample, and contains some choice expletives. No doubt our escorts were picked men, and, of course, they had their faults, but, taking them as troopers are, they could be relied upon.

Apropos of coarse language and foul-mouthed oaths and kindred conversation in Mexico, I can speak only from my own personal experience, which was necessarily limited, though it was also varied enough. Leaving out the pulque-sodden stratum of the population, in the larger upland towns the natives are a wonderfully well-spoken people. There is an almost complete absence of those ever-recurring foul expressions which jar on the traveller's ear in Spain, and their behaviour towards each other under the most varied circumstances leaves nothing to find fault with. In all our wanderings there was nothing that a lady need be afraid of having to witness. Sometimes, indeed, the lack of well rounded off knock-you-down oaths was almost ludicrous, but this cannot possibly be the fault of the language. The only effect of such choice phrases being hurled at them—and in this respect every white engineer, planter, or miner, could give them points—was that they turned sulky and nursed their resentment with the hope of letting their enemy meet with some " disgracia," a serious little accident. But they never retaliated in words ; " no es costumbre."

One of the greatest necessities on such expeditions is a good servant. Our gentle Mateo Trujillo having died, we spent much anxious time in Mexico City in procuring a substitute. It was imperative that such a person should be a " hot-country " man, the natives of the central plateau being liable to collapse when taken into the tropical districts. At last we closed with

one Ramon, a native of Oaxaca, but now living in Mexico City with his family, after having served in various capacities in a wealthy gentleman's family. His master had been murdered whilst travelling through his large estates in Guerrero, and Ramon never tired of explaining that this had happened whilst

RAMON.

he himself was accidentally not on the spot. This explanation was intended as a kind of self-recommendation. He had one great point in his favour, he was absolutely honest, but honesty is rather more of a negative than a positive advantage. Such a man may be honest for want of initiative or courage. Lately he had been employed as a clerk, and

whenever we were in a town he spent hours and hours in making up our accounts, which he copied and recopied until the bill was a masterpiece of caligraphic execution and probably correct to the last centavo which had passed through his hands. In the towns, indeed, he was a treasure, but in camp he was helpless, and of courage he had none. Personally he was rather short and strongly built, with the typical hooked nose of the Zapotec Indian, of middle age, and possessed of a deep hoarse voice which harmonised with his somewhat gloomy, although not morose, disposition.

It was not easy to break such a man in, and to instil into him livelier ways. One of the first lessons he received was intended to break him of the stereotyped answer, "Quien sabe." "Now, look you, Ramon, never you use that phrase again if you value your present engagement of two pesos a day; if you don't know, find out." Henceforth his usual retort was "Ningun sabe, pero voy informarme"—"Nobody knows, but I'll inform myself." Fancy the task of turning such a fellow into a collector of animals and plants.

With this Ramon, a muleteer, three rurales, and with four pack animals, we set out on our journey south from Iguala to Chilpancingo, there to present our credentials to the Governor. Four "cargoes," or loads, may appear much, but previous experience had taught us that we could not do with less. The heaviest item was, of course, the tent, which formed one complete load. Then there were the camping-beds with bedding, two panniers, two so-called water-tight tin cases, the canteen, collecting boxes with alcohol, bottles, jars, wire cages for live creatures, rifles and ammunition, and last, though not least, a considerable quantity of preserved food in boxes. And when all this bewildering mass of baggage was at last safely packed, there was still quite a heartrending number of odds and ends which somehow or other had hidden themselves, and which appeared at the last moment to be tied on in positions where they soon came to grief, or were sure to be in the way.

The distance from Iguala to Chilpancingo is about 70 miles, and can be accomplished in two long days, a performance which nobody has yet considered a pleasure. Iguala lies at

an elevation of 3,000 feet, Chilpancingo at 4,000 feet, but in between them is the Balsas river, at a height of only 1,500 feet above sea-level. Immediately to the south of Iguala begins a steep ascent of near 1,000 feet, and then the track slopes more or less steadily down to the river. Before noon our party was reinforced by three more rurales who had come up from Mescala, and the first camp was established at a pretty spot near a ranch famous for a deliciously cool and pure spring of water which bubbled forth between the roots of a huge "amate," a kind of fig-tree. Humboldt, who followed up this

LEAVING CAMP AT VISTOLA.

same road from Acapulco in 1803, mentions this identical spring as the Fuente de la Extola. It is now variously called Vistola, or Pistola. Close to it is a small cattle ranch, and the great number of cattle in this valley was a great drawback, since, as usual, they rendered every stream undrinkable, and caused the whole neighbourhood to be infested with flies. That is the curse of a cattle country; every drinking place is filthy, bad enough to upset horses and mules, which, in Guerrero are certainly not squeamish, poor beasts; and should the grass or ground look never so clean and inviting, one has only to camp there to find that the flies and smells and dirt—as if there

were not already enough discomforts without them—make the nights at such a place a burden both to man and beast. However, after various attempts we alighted upon a pretty spot, protected from the almost ubiquitous cattle on one side by a craggy hill, and on the other three sides by a ravine and a brook. Here was an abundance of wild "rabbits," tortoises (*Cinosternum*) in the brook, a young boa was encountered on the track, and the wooded slopes, here and there beset with branching organ cactus, were enlivened with the excited chattering of numerous "chachalacas," or bush-fowl.

As we descend gradually towards the Balsas river, the track following for the most part a small river with a valley that here and there broadens out into swampy meadows, the scenery becomes more tropical. The "mulato" tree is plentiful, with its red bark which peels off in many thin layers, like red-brown tissue paper, and, wherever there is water, *Cassias*, of which one is called the "morning glory," attract the eye with their thousands of yellow or orange blooms appearing amidst their dark-green foliage. Where the ground is drier and higher, composed of stones and rubble, the landscape is crowded with columnar and candelabrum cactus and with tall opuntias. The people congregate in streetless villages, "streetless" because their huts and other "buildings" seem clustered together without rhyme or reason, mostly on some prominent slope overlooking the valley. Xalitla is such a place.

A dwelling-house here consists mainly of a solid, oblong roof. well thatched with reeds, and coming low down on the two long sides; the entrance is at one of the shorter sides; the walls are flimsily made of wattle-work, and there is no special verandah attached to the house, but shelter without is generally provided by a simple sort of thatch, or trellis, raised upon uprights. As a rule, there is also a store-house, more solidly constructed, the wattled walls being covered with clay. Each property or courtyard is enclosed by rude fences, none of which are ever new, and it is not easy to say whether they are intended for keeping creatures in or out; most probably they only prevent from straying things like pots and pans and other implements, whilst fowls, pigs, don-

keys, and children roam about without hindrance, the many gaps in the fence increasing as the dry sticks are gradually used up for firewood. There is no stationary hearth, the little fire being built on the ground inside or outside the house.

An agreeable feature of these natives is their fondness for animals. The donkey is frequently alluded to as " el paulino," according to Spanish custom, " the little small one," but when

TYPICAL VILLAGE SCENERY; THE TREE IN THE CENTRE IS A "CUAUTECOMATE."

reprimanded it is " burro," or " burra " ; it is least, however, attended to, since it manages to eke out a living where every other beast would starve ; it will let itself get drenched in the rain, and stand with a no less stoical look for a whole day in the broiling sun. Not so the horse, which practically lives with the family, and takes its meals of Indian corn, neatly spread out upon a " petate," or mat ; while for the rest of the day it is tethered under an awning, where it partakes of

"zacate," the fresh or dried stalks and leaves of the maize plant. This intimacy makes the horses very tame, so that they never kick or bite; some were too tame for camp-life, since they sought shelter near the tent, and several times in the morning we found the mat at our entrance occupied by a horse which had found this leeward side a convenient spot to sleep upon.

The mule is a paradox in every respect. Physically, it combines the hardness of its father with the delicate constitution of its mother. Nothing which a donkey does eat, hurts it; a horse is with difficulty prevented from eating the wrong kind of grass, and thus causing trouble in the camp. Certain mules have a craving for their owner's property, for instance, the stuffing of the pack-saddle, or their own sweaters, which are sensibly constructed pads made of the husk and fibre of cocoanuts; they will even eat horse dung, yet these same animals may be most particular about drinking water if it is not clear. They catch cold, and are liable to develop enormous boils on back or shoulders, the result of sores which do not much inconvenience the poor donkey. Every mule has a temper, and this is rather bad. It kicks and bites, the rider's toes being a convenient object for conveying a hint that something is wrong with the saddle or girth; some mules have a knack of cannoning against a tree, or perhaps a projecting rock on the side of the track proves an irresistible attraction, the rider's knee having to act as a buffer. On the other hand, if there is a precipice, your mule will walk along the very edge; that is sure to happen, and you will get accustomed to it, but it will also as likely as not make half a turn, stand still, and deliberately look down. That is a trick which never loses the charm of novelty, because one has heard of ledges and stones giving way. The gentle use of the reins on such an occasion is at once resented by an impatient jerk of the head, whilst a whip or spur might have disastrous results. The muleteer will call out to you and to his special saint, in bad cases: "Por el amor de Dios," to sit still and leave the brute alone, since it is "only measuring the depth." But things reach a climax when the mule, thus blocking the way, kicks

out at the next animal coming up behind. When it is all over, the inexperienced rider will probably have it out with his beast, which, if not resentful at once, makes a mental note of it and abides its time.

An overloaded donkey will lie down and refuse to get up until its " carga " is properly adjusted ; but the mule displays some unexpected liveliness, either kicking or throwing itself down and rolling on its back, or rather, on the baggage, which in either case gets scattered about. Then follows a painful scene and delay. Some things have to be taken off this load and added to another, which, having already been properly strapped, has to be undone, and the process may have to be continued until maybe the whole string of animals has been readjusted. Of course, native trade is carried with comparative ease, sacks of ore, leather bags with honey, pulque skins, all have their regulation size and weight, and recently the people have taken kindly to the cans and packing-cases of the Standard Oil Company, these being conveniently-sized receptacles for all kinds of goods. But imagine the difficulties presented by our ill-assorted, odd-sized luggage, with its packages of unaccustomed size, and scarcely ever put on the right way up, an arrangement not exactly beneficial to their contents, and not a little disastrous when, during the crossing of a river, the water finds its way into the lids.

By the way, every muleteer in Guerrero carries with him a strap of leather, sometimes neatly plaited or otherwise adorned, with which the animal is blindfolded during the ordeal of packing. During the march he holds this implement in his hands, using it as a whip ; and in any case it is the sign of his trade. The animals are fed twice a day, with maize and " zacate," if that can be procured ; once in the morning before the start, and once in the evening. During the night they are invariably turned loose to find what pasture they can. The result of this is that the hungry beasts stray, and the search for them in the morning is a business which is often anxious, and always annoying ; or they run about the camp, get entangled in the tent-ropes, and resort to all kinds of tricks which keep one awake. It seems so easy to prevent this by

tying the animals, or by hobbling them. But this was only done on the rarest occasions, and there were then invariably many excuses. Either they had no ropes, though dozens were lying about, or the beasts might get entangled in the bush, or they would not find grass enough, or the "tigre" might come and eat them up; but the real reason was that "it is not customary"—the universal euphemism for laziness.

Besides domestic fowls and turkeys, an Indian hut generally possesses a pair of musk ducks, often only a solitary specimen, and it is a touching sight to see how this bird, away from any pool or stream, considers itself as part of the household, sleeps in the hut, and superintends the grinding of the corn. This musk duck (*Cairina moschata*) is a native of South and Central America, and has from time immemorial been domesticated in Mexico. The drake never reaches the huge and ponderous size which it attains in our better-fed and better-bred European specimens; otherwise they show the same amount of individual colour variation, chiefly in regard to the extent of the white, but, curiously enough, there is often also much yellow in the plumage. Our ordinary domestic duck not being kept by the Indians, the musk duck is simply known as "pato," though elsewhere it is distinguished as "pato mudo," or mute duck.

Real pets are made of the "chacalacas" (*Ortalida poliocephala*), the most northerly species of this Central and Southern American family of wood-fowls. The name is a good imitation of their cry; when there are several of these birds together in the bush, they announce their presence by making a tremendous din with the repeated utterance of "Chacalac, chacalac," these sounds being uttered in even quicker and quicker succession, and with increasing fervour. The birds, chiefly the males, which utter them, are, however, difficult of approach. Very shy, and preferring thick bush land, they stop their chattering instantly at the slightest noise caused by our approach through the jungle; but with patience a bird may be espied as, with its head and neck erect, it stands motionless on a high branch. If it thinks itself discovered, it will drop down like

a stone and vanish, running away amongst the thick undergrowth. They are rather restless, taking long upward leaps with but slightly opened wings, and hopping from twig to twig, which they grasp with their long toes. They build their nest, as a rule, rather high up in a tree, but sometimes they select an old trunk only about seven feet from the ground. The nest is made of twigs and grass, from ten to twelve inches in diameter. They lay from two to four eggs, begin breeding in May, and hatch their chickens mostly about the beginning of July. The natives take the eggs and set them under their hens, and such domesticated "chacalacas" become very tame and affectionate. On our return journey we bought a beautiful specimen which, by that same evening, perched in the tent, took food from our hands, and behaved as if we were old friends. In the daytime it travelled in a reed basket. It soon got some companions, these being a quarter-grown and two small chicks, which, by the way, like other fowls, rapidly moult all their wing and tail quills, and that, too, several times in the course of their first year. This family attached itself to us at once; being chiefly fruit and leaf eaters, they were easily kept on bananas, oranges, lettuce leaves, and bread and milk.

Then there are lovely little parrakeets (*Conurus canicula*), grass-green, with orange and blue foreheads and ivory bills, the lower jaw with a dusky patch which gives them a rakish look. These little things are taken out of the nest when young, and, after having their wings clipped, are allowed to flutter and climb about. The dogs do not hurt them, and there are no cats. The usual price of such a "perrico" is a real (about 2½d.); the Indians take them to the towns on marketing days, and feed them on "massa"—*i.e.*, the dough out of which tortillas are made. "Massa" is, of course, the stuff which is offered to everything indiscriminately.

But to continue our journey. By noon of the second day out from Iguala we reached the Balsas river, here called Rio de Mescala, after a village on the left side. The views of the big river, as seen from the track which winds up and down over knolls covered with bush, or interrupted by green grassland, are rather fine. At last the track follows the right bank

of the river, over many limestone ledges, like little terraces, which become more numerous as the water recedes when it has not rained much. There is a large ferry, subsidised or, rather, let out by the Government. It is big enough to hold half-a-dozen horses. When everything is stowed safely on board, the flat-bottomed boat seems at the mercy of the strong current, which flows over a bed of hidden boulders, and now

BOYS FILLING GOURDS WITH WATER.

and then sends a little splash into the faces of the trembling horses. But the three boatmen know their business, and manage to reach land on a shallow some hundreds of yards lower down on the other side of the river. There is a collection of some large reed huts and shanties, kept by the toll-keeper and administrator of the ferry, and here the wayfarer bound for or from Chilpancingo stops as a rule, and no doubt fares badly.

However, this did not concern us; what troubled us were

the reports of the condition of the Cañon del Zopilote, a long river gorge which leads from above Mescala directly southwards. The river bed forms the track, and when a spate comes down it is impracticable. Nobody had used the cañon for some time during this rainy season, and the mountains were certainly wrapped in thick blue clouds. Therefore we followed the Balsas for a mile or two, crossed the Zopilote where it was broad and shallow, and established our camp on a knoll, close to the village of Mescala, but separated from it by another river or, rather, broad bed full of sand and rubble, with meandering streams of water.

The village itself has nothing to recommend it; on the contrary, it does not enjoy the best reputation, and we prefer to leave it undecided whether "mescal," the strong spirit distilled from a kind of agave, is responsible for this. There are wattle-walled, reed-thatched houses, of which some are of pretension. Frequently the house, which is screened by an impenetrable fence of cactus, possesses a large verandah, or, rather, covered-in courtyard adjoining. This part is kept clean, the floor or ground is made of stamped-down clay, the walls are whitewashed, in a corner is a niche with a little table in front, the private house altar with the Madonna, some saints, and bouquets of withering flowers. There are garden-like patches between the various fences, with " papaya " trees, and the loose soil yields plenty of gourds and water melons, whilst there are whole fields of " ajonjali." But it is not a cattle district. The numerous donkeys indicate that the chief industry is the transitory traffic.

The river here is about 516 metres above sea-level; provided this calculation is right, and the river's elevation at Rio Balsas Station is 432 metres, then the river falls about 84 metres, or 277 feet, in less than ten miles. The Balsas valley is noted for its stuffy heat, and its plague of insects, and the night, with its drizzling rain, was intolerably close, so that I crept out of the mosquito curtains, and relying upon my usual indifference to, or immunity from, insects, slept in the open air, clad in nothing but a short jersey. Nobody slept much during that night, and by the morning my whole

body was literally covered with tiny black specks, each of which was an almost microscopic fly, which left a red inflamed spot behind. Our men explained that we had fallen in with the "chaquistle," their most dreaded terror, which thrives best on such hot, muggy nights. These creatures are really terrible, and the expression of the natives that the "chaquistles" feel like red-hot sand describes the sensation perfectly.

Already in the afternoon both rivers, on either side of us, rose considerably, and we decided certainly not to try the cañon. Accordingly, we followed the broad and flat valley on our right, and after a few hours began to climb what proved to be a spur of the plateau, or, rather, the remains of a cretaceous tableland, most of which has been washed away, leaving a bewildering, intricate mass of spurs, flat-topped cones, cañons and valleys emerging northward upon the Balsas. On the top lies the village of Xochipala, which means "flower-hill," about 1,180 metres (3,890 feet) above sea-level, *i.e.*, more than 2,000 feet above the Balsas. The terrain is composed of a very hard bluish limestone, with horizontal strata; as usual with such formations, its surface is rendered uneven by innumerable shallow holes with sharp edges, everything being covered with about a foot of black, rich soil, which, when it rains, is turned into a slimy, pasty ooze. The name Xochipala seemed justified by the abundance of *Sprekelia formosissima*, *Bessera elegans*, orchids, and other bulbous plants, which covered whole meadows. The village itself was of medium size, but seemed quite deserted, except for a girl who was washing in some of the natural rain cisterns. The houses, in conformity with the altitude and exposed position, were all carefully daubed with lime and clay.

Soon after noon, after a short rest, we were overtaken by our pack-train, conducted by the muleteer, Ramon, and one soldier, and then began the steep ascent into a veritable maze of gorges. We soon descended from the hard limestone crust and reached softer cretaceous soil, partly overlaid with reddish volcanic rubble. Some 2,000 feet below the top the track joined the bottom of a gorge amidst andesite formation. This

twisting gorge was a very interesting place. It might be described as a triangular cleft, with a boulder-strewn or sandy bottom, which fortunately held but little water; the sides rising to at least 2,000 feet, either precipitously, or sloping enough to be covered thickly with shrubs and even with trees. At the bottom reigned perpetual shade, the trees from the opposite sides meeting and forming a canopy, whilst the ground was covered with an abundance of tradescantias, ferns, and, above all, carpeted with selaginellas. Sometimes the river-bed had contracted, and the spates had eaten out overhanging ledges in the brown or yellow loamy banks, these being held together only by the tangle of the exposed roots. Such places were much frequented by cattle and by stags, which had scratched deep hollows into the salitrous soil. Wherever the moist river sand had been manured by these animals, the ground was covered with butterflies, which fluttered about in myriads, attracted by the salty moisture.

The meandering river-bed exposed at every moment new scenes, and its turns were so bewildering that one could not possibly guess in which direction the road would ultimately emerge. At the bottom the whole vegetation was tropical. A little higher the steep slopes were covered with the upright columns of cactus, every ledge, every possible space of foothold, being appropriated by this plant; then followed an admixture of oak, and the whole scene was crowned with pines.

At last we emerged upon the valley of the Zumpango river, near a place called La Venta Vieja. There were a few reed huts in this broadening valley, affording a half-way resting place for the pack-trains. They have either to be dragged over the Xochipala track, which involves a terrible amount of fatigue, or else they follow the dreaded Cañon del Zopilote. This valley practically divides the whole cañon into an upper and lower half. We had expected to find our pack-train here, and had for the last hour or two been rather puzzled by the absence of any signs of it, and the people in this valley had not seen it either. There was nothing left for us to do but to push on through the upper cañon, near the southern mouth of

which is the Venta del Zopilote, a shelter-house, built by the late Governor of the State.

On our return journey, two months later, we travelled through the whole cañon, which we may, however, as well describe here. So far as the road is compelled to follow the river-bed, it is about twenty miles long, with an almost steady fall of some 1,000 feet, averaging a fall of sixty feet per mile, and this gorge forms the sole communication with Chilpancingo, or, to put it more forcibly, it is the *high road* connecting the port of Acapulco with the capital of Mexico. This was the case at the time of the conquest, Humboldt had to use it a hundred years ago, and an Acapulco-Mexico railway, *viâ* Chilpancingo, Mescala, Rio Balsas, and Iguala, will, no doubt, eventually follow this route. In the meantime it would be money thrown away to construct a cart-road, as every rainy season it would be washed away. The muleteers reckon that the river-bed is crossed more than a hundred times, and this is certainly no exaggeration. At low water the actual bed is followed, though, wherever possible, short cuts are taken; but there are many parts where the bed is full of big boulders, or where it narrows so much between steep rocks that there is no way out of the torrent, and even when this is only a few feet deep there is nothing for it but to wait until the spate has passed. *Rusticus expectat dum amnis deruat.* It is the danger of being caught in such a trap which has given the cañon its deservedly bad reputation.

Progress was very slow, and our acute hunger was but partly appeased by a few unripe fruits procured from a downward-bound caravan. It was night before our pack-train appeared, but how, where, and why they had lost the way remained a mystery for all their endless excuses. It was a grim, if our only, satisfaction that the laggards had not had bite or sup ever since we all left Mescala at six in the morning, and that they were thoroughly played out. The river water was dirty and nauseous, and a spring not far from the Venta was not disclosed to our party until next morning, when we soon came to a hamlet, called Mesquititlan, in allusion to the abundance of the spiny mesquite shrubs, and a kind of thorny

acacia (*Prosopis dulcis*). The owner of one of the huts was a friendly, and rather a pretty, woman, who was willing both to sell her stock of tortillas and to prepare more, a delay which, although at the beginning of the day's journey, nobody resented.

This spot marks the southern end of the cañon, the valley

ZAMBA OF MESQUITITLAN.

broadening out until we reached the large and important village of Zumpango, which lies on a fertile plain. This is a very old place, and notable for the numerous antiquities which are now being found there, or rather, are still hoarded by the natives. In a publican's shop were displayed strings upon strings of stone beads, which the old rascal had artfully interspersed with amulets, little stone figures, memorial medals, and small brasses of Spanish origin. Amongst other

things he had a beautifully carved obsidian figure of a frog, After endless bargaining we secured various ornaments, the nicest of all being the exquisitely carved image of a tiny toad.

Zumpango del Rio is a large and healthy, but cheerless, bleak village. Its Aztec name means " Place where skulls were exhibited," from "tzom," a skull, and "pantli," a banner. There are several Zumpangos in the country, for instance, north of Mexico City, and their complete hieroglyph—we should call it a coat-of-arms—is a row of skulls strung upon a crossbar, surmounted by a flag, possibly meant as a warning to the conquered survivors. The road continues to ascend over calcareous, sparsely-wooded terrain to the pass, about 4,400 feet above sea-level. Thence it is only three miles to Chilpancingo, but Ramon had broken down with gastric troubles, and thus it came to pass that we had to camp at the nearest water-hole, which had been spoken of for the last three hours as just round the corner. The spring was good enough, the landscape with its fields, pastures and wooded hills not bad either, but this was scarcely what we had come for, and was, moreover, marred by heavy rain which soon set in.

Chilpancingo lies in the midst of a plain, in a hollow on the top of the watershed between the Balsas and the Pacific. Its elevation may be a little over 4,000 feet ; I say advisedly " may be," as this is a much-contested question since the time of Humboldt, who returned it at 4,570, while some railway surveyor gave its height as about 3,960 feet, and even two recently undertaken geological surveys differ by as much as 410 feet. After many calculations, checked on the return journey, I arrived at the figure of 4,090 feet. The official altitude of the town is 1,193 metres (3,913 feet). Whether the additional lift I thus gave it will be duly appreciated is doubtful, but it is certainly in the right direction. The climate is cool, much more so than one would expect from its latitude (17° 32′ N.) and moderate elevation. This is to a great extent explained by its proximity to the watershed of the Sierra Madre, and by its being open to the south-east winds, which bring the

rain. The southern currents coming from the sea and crossing the " tierra caliente " are, of course, warm, but they are caught and directed upwards by several ridges of the Sierra Madre. The windiness of the place is suggested by the report that all the women wear trousers. Be this as it may, the town is healthy, so much so that no good qualified doctor can be induced to stay there. Thunderstorms gathered regularly every afternoon, and it poured heavily for several hours, so that by nightfall the temperature was chilly, falling readily to 60° F.

There being two inns, we went to the Hotel del Sur, as being " el mas limpio "—the cleanest. This establishment has the usual patio with a fountain, amaryllids, Indian shot plants, bananas, roses, and collocasias, surrounded by a few barely furnished rooms. It had recently been taken over by a Cornish mining engineer. The servant question was a real difficulty, and without intention I added to it. One morning I caught the " mozo " myself to make him clean the room, and for the better look of the thing, I laid my hippotamus-hide riding-whip on the bed. From that moment the " mozo " was not seen again, and nobody knew what had become of him, until in the afternoon a policeman came with the complaint that a terrible " gringo "—the contemptuous term for an American, which every non-Mexican is considered to be—had attacked the " mozo," and nearly beaten the life out of him. They had only a few days before imported from Acapulco a Chinese cook, who, still innocent of Spanish or English, was not easily communicated with, but he had brought with him a lump of yeast, which he had nursed all the way in his handkerchief, and therefore the hotel could provide leavened bread. The rooms and the verandah being paved with red bricks were horribly damp ; everything became mouldy, and our collection of plants, which it was hopeless to keep dry, suffered most of all.

Chilpancingo, meaning, perhaps, the " little Chili river," has been selected as the place of Government mainly on account of its central position, though it has even now scarcely 7,000 inhabitants, far less than either Acapulco or Iguala. It possesses

nothing of special interest in the way of industries or buildings. The latter were, a few years ago, in 1902, ruined by a severe earthquake. The church was still an utter heap of ruins, but on the site of the old Governmental residence a fine palatial structure was near completion.* It costs a great, and apparently quite disproportionate, sum of money, but the difficulties or such an undertaking are appalling. Nearly everything, whether iron joists, locks, lead sheets for the roof, cement, windows, or doors, has to be carried or dragged by mules or donkeys

RAIN-WATER PIPES FOR THE PALACE.

over from Iguala. We ourselves met on the road a long string of donkeys, each trailing behind him a pair of iron rain-water pipes, a piece of wood being stuck into the end to prevent abrasion. But the oddest and most impressive sight was the conveyance of a big iron safe which some banker had set his heart upon, in spite of the suggestion that a cemented vault would be much cheaper and equally effective. Under the shade of an "amate" tree, by the side of a stream, we encountered a

* The whole town has since been destroyed by another earthquake, in the spring of 1907.

crowd of more than thirty men squatting round the enormous safe, the women busily preparing tortillas. Then the whole crowd took up the gorgeously painted load slung on two long poles, and scrambled singing up the opposite bank. When on flat ground they trotted, as is the custom of all "cargadores," who usually load themselves up to staggering point. Thus, with frequent halts, the long journey was made, and if they accomplished it in a week, that safe must have become expensive even at low wages, and, of course, the owner could not employ forced labour. It was otherwise with the palace. Much of the menial work was done by prisoners, guarded by the police, but most of the skilled labour had to be imported, such as carpenters, joiners, plumbers, and when these were slack, as happened, for instance, on a Monday morning, the palace was deserted for the rest of the day, because the whole lot of them had been put into prison for future encouragement. Prisoners are reasonably enough used for various public works as, for instance, for road-mending. The method of guarding them throws a peculiar light upon the various degrees of reliability of the armed forces. In places which have a garrison of regular soldiers, a small detachment of them is marched out with the prisoners, but the soldiers themselves are looked after by the municipal guard, or ordinary police, while last not least, a couple of mounted rurales patrol the neighbourhood in case something might go wrong or astray. It is to be remembered that most of those who are doing a term of soldiering are either evil doers, although not quite deserving of imprisonment, or suspects, or else perhaps men who are merely under a cloud.

Of never-flagging interest was the "mercado," a large paved square surrounded by stalls under a pillared shelter. Of native make, at least, produced in the Indian town of Chilapa, to the east of Chilpancingo, are the "rebozos" worn by the women, which are invariably of a blue colour, mostly striped and furnished with tassels of various patterns. Another staple industry of Chilapa are the large straw hats, and zarapes, or mantas. The people from the country come in with their donkeys early in the morning, and their produce is exhibited

on mats, superintended by the women. There is, to sum up, an abundance of fruit of many kinds, but it belongs to so many sellers that one wonders how it pays them to bring so little, and that little, too, from a long distance. The sellers spend most of their time in arranging the various exhibits in tiny heaps. For instance, one makes piles of four potatoes each, then

FRUIT MARKET AT CHILPANCINGO.

contemplates them and deliberately takes a small potato away here, a large one there, and rearranges the whole. But let us watch her neighbour, who has brought a small basket full of "frijoles," or black beans, which are first measured out in tiny vessels and put on the mat in little heaps, or into "jicaras," or gourds. When all her goods are displayed she cannot resist taking one bean after another off each pile;

she has plenty of time and more to talk about with her neighbours, or to haggle with the bystanders, and if you wait long enough you will see, growing bean by bean, a new little heap of these. There are Indian corn, never offered by the sack, gourds, melons, aguacates, mangoes, chirimoyas, and piñas, or pineapples, from the low countries, several kinds of bananas, flowers and "panoche," a brown crude sugar paste, wrapped in the husks of Indian corn. There is no lack of local colour to delight an artistic eye, what with the black beans, the golden maize, ruddy pines, and, above all, the chili, vividly green, or fiery red. There is a hum of voices, but there is not much individual noise, no shouting, yelling, cursing or quarrelling, let alone fighting, although every man has his machete; and when he has partaken of too much mescal the average country Indian becomes rather sad, and friends lead him away to some quiet courtyard, where the donkeys are, to avoid the ubiquitous policeman.

Indicative of the temperate climate is the paucity of rice, absence of oil, cocoanuts, cotton, pineapples, all of which, when seen in the market, have been brought from warmer districts, the bulk of the trade being formed of sugar-cane, sugar, chili, Indian corn, beans, and mescal.

Our servant and supposed factotum being ill, and recovering but slowly, we got together a little brigade of boys, who scoured the country for anything of a creeping or crawling nature, and taking it all in all, the results might have been worse, considering the rather barren look of the neighbourhood. Amongst the more interesting creatures were the abundance of *Glauconia dulcis* and *G. albifrons*, degenerate burrowing kinds of snakes, and a bug with peculiar discs on its antennæ, *Thasus*, a genus of hemiptera.

Our sole object in going to Chilpancingo at all was to come into personal contact with the Governor, knowing well from previous experience that even the best of introductory letters loses much of its effect if not delivered in person. It was

certainly a long and laborious way to this town, but the results surpassed expectation.

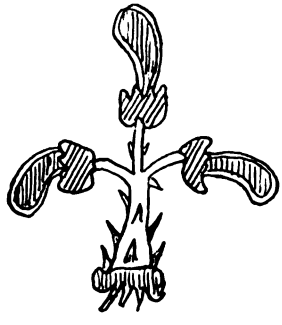
El Sr. Lic. Don Manuel Guillen, a native of Guerrero, had received his education in the eastern states of America, and had filled an important position for his Government in San Francisco. A barrister-at-law, whence his title of Licenciado, or " one licensed to plead," and a wealthy landowner in or near the Valley of Mexico, he had been employed by the President —with whom he is connected by ties of intimate friendship— in various delicate missions, requiring unusual tact.

A former Governor had " pronounced " against the Federal Government, which, in other words, he wanted to upset, putting himself at the head. The President sent Don Manuel as plenipotentiary, backed by an army, to bring the rebellious Governor to Mexico City. Don Manuel, instead of causing a bloody civil war, managed to surround the rebel and his adherents without allowing a shot to be fired, and then used his powers of persuasion so well that the foe, now a " pronunciado," accompanied his sagacious conqueror to Mexico City, there to make his peace with the President. Since no blood had been spilt he was forgiven, and had the good sense to die within a year.

Don Manuel had but recently become Governor of Guerrero ; not having a proper house he had to lead a bachelor's life at Chilpancingo, where, with one or two exceptions, suitable society is non-existing. He yearned for his family, but did not dare to inflict the journey upon the ladies. Bismarck's motto, *Patriæ inserviendo consumor*, seemed to be applicable to his case.

Well, he was a delightful conversationalist, and could fully understand and appreciate the object of our little expedition. Perhaps he felt it a relief to come into contact with someone who had other aims than squeezing out mining, wood-cutting, estate-jobbing, and similar concessions. " Tell me where and when you want to go, and I shall not only give you a better, more suitable escort, but shall provide the necessary horses and pack-animals, and letters to the various local authorities will be ready at the same time." We only regretted that

during our stay in the town—we in that miserable inn, he in the temporary official quarters—we had few opportunities of enjoying his society. Alas, I have now to add that he has since died.



HIEROGLYPH—MIZQUITLAN.
Mizquitl, the leguminous Gum-tree (*Prosopis dulcis*).

CHAPTER XVIII.

THE MOUNTAINS OF OMILTEME.

An Excursion into the Heart of the Southern Sierra Madre—Character of the Fauna and Flora—Macaws, Jaguars, Stags, and Peccaries—The Blue-tailed Skink.

The chance of paying a visit to the Sierra Madre del Sur, instead of simply crossing it at its lowest depression by the Acapulco trail, was not to be thrown away, especially since it appeared under most alluring conditions. Horses and an escort were at our beck and call; we had only to ride up to Omilteme to the house of a certain Don Augustin who, living at Chilpancingo, had placed his "*châlet* in the mountains," with all its resources at our disposal. As he had advised his "mayordomo" of our intentions, and the servants would be only too delighted to render our sojourn there pleasant and profitable, we went to rest with the charming prospect that the morrow would be a day without worry. At sunrise a lieutenant with two gendarmes hammered at our gates, roused the whole inn, and presented himself as ready to march. But there were neither pack animals, nor saddle horses for us, and since they did not appear even two hours later, the escort was dismissed. Then the saddle-horses at least did turn up, but instead of pack animals their "arriero" came to bargain. Eventually, however, all was ready, except that one of the horses had to be shod, and I had to hunt up the three members of the escort, who meanwhile had prepared for a day off, one in the barracks, another with his family, and the lieutenant nowhere. At last we got off with one soldier who had meanwhile found his superior officer, while the others were to follow on with the baggage.

The track to Omilteme makes a long *detour* to the north-west, along the foothills of the sierra, which, near the calcareous basin in the midst of which the capital is placed, are rather barren. It follows the brink of a precipitous gorge, where abounds a kind of dwarf date-palm attaining some twenty feet in height, while in the moister places are clusters of fine-leaved bamboos. Amidst green meadows, with herds of cattle and fields of Indian corn, lies the wretched village of Amejileca, fenced in all round with a stockade, the wattle-and-daub houses thatched with grass and bamboos. Here the character of the terrain changes to hard blue limestone of the lower cretaceous age.

Soon we enter a gorge of this formation, and the ascent begins, mostly following the brink of the boulder-strewn bed of a brook. Below, to the left, at the bottom of a vertical wall of rock, is a cavern, out of which rushes a fair-sized stream, the same which at Chilpancingo lost most of its water underground. At about 5,500 feet of elevation—*i.e.*, about 1,500 feet above the town—a marked change takes place in the vegetation. The palms still continue for another three or five hundred feet upwards, but the oaks, represented by small kinds with large woolly leaves, give way to taller trees which soon form forests, where the long-leaved "ocote," a pine, makes its appearance. Most of them are festooned with the long, corkscrew-like, pendent plants of *Tillandsia usneoides*, which are beset with small grey leaves, and here and there show a tiny, inconspicuous flower. Here, amongst the combination of palms, oaks, and pines, the semi-alpine scenery was charming. Long-trailing purple convolvulus with dark leaves crept over the rocks, the star-shaped red flowers of the *Bessera elegans*, with their white and blue veins, as well as glorious orchids—*e.g.*, *Cypripedium izaplanum*—grew in the meadows, together with a profusion of other bright flowers, and the stream, which we saw emerge an hour ago, disappeared here into a narrow cleft of the mountain. It was a little difficult to scramble along the bed into that gorge, but it was well worth the trouble. Scarcely a dozen feet wide, sometimes less, but in many places at least eighty feet high, with stalactites in

plenty, its vertical walls of limestone were polished up to a height of twenty feet, but during our visit the water was low and allowed our party to penetrate. On the ceilings clustered hundreds of young swifts, fully fledged, but not yet ready to leave their cave, whilst swarms of the old birds rose like a whirlwind, and then gyrated about in the open. The whole mountain

PINES, PALMS, AND OAK.

must be honeycombed with clefts and caves, otherwise the outflowing water could not have formed such a large stream.

Not far from this place is another large cave, likewise containing stalactites, but dry, and with an icy cold draught rushing out; its huge vaults were not tenanted, even by bats. These and several other caves are, or rather were, so many outlets of a big lake in the mountains, the bed of which

is now a very fertile valley, filled by the disintegrated *débris* which has been washed down from the partly volcanic, mostly metamorphic, formations of which the higher mountains are composed.

A " guacamayo," the Aztec name of the macaw *Ara militaris*, announced the arrival of our party to his mate by a stentorian note, several times repeated, and this was answered afar off. Later, when the pair had united, they emitted different notes, and then watched us, sitting side by side, not at all conspicuous in spite of, or, rather, because of, their gorgeous dress. These birds are more at home in the temperate forests of the mountains than in the sweltering low-lands, and at the rainy season they feed chiefly on the seeds of the big pine-cones, which they easily open with their powerful beaks. Whether they are stationary during the " pine season " is doubtful ; they do not breed in the higher, but only in the tropical regions, but they fly so amazingly well that they can easily ascend for their meals, and return to their nests and sleeping places in the huge hollow trees.

Soon the ascent became awkward, indescribably steep at places, with a deep red loam turned into a sticky mud by the last night's rain, which had filled the holes, and had thus also hidden the treacherous roots. The incessant ups and downs of this " switchback " road, with the climbing up of a spur, or big boulder, only to tumble and slide down again on the other side, though all the while we were steadily ascending, were most fatiguing, and made us feel uneasy about the pack animals, especially since thunder was increasing on the higher sierra. By 4 p.m. we had quite enough of it, but it took another hour before we reached Omilteme, well drenched by the rain.

This place, a regular " Alp," in Swiss parlance, lies in a natural opening amidst forest, meadows, and streams, and consists of a few scattered huts. Don Augustin's *châlet*, used by him as a half-way station on the way to the mines of La Dicha, is constructed of pine-planks, thatched with palm leaves, and has boarded floors, a ceiling, and a verandah. Instead of the expected civility, we met with a refusal of

admittance from the surly bailiff in charge, and likewise of food, fodder, and shelter for the rest of the party. However, much can be done in a lonely place when the request is backed by two gendarmes.

By seven o'clock it was pitch dark, and raining, and we had to give up the hope of seeing our baggage. In the room were two "catres," the folding bedsteads of the country, while Toribia, a nice, obliging girl, provided the whole available

THE CHALET AND OUR ESCORT.

stock of six zarapes and two straw mats. In spite of these we felt miserably cold in our damp clothes, with a temperature of only 55° F., and we sympathised with a crying baby and its incessantly coughing parents on the other side of our partition. At daybreak, to our joy, we found the baggage piled up under the verandah, where Ramon and the "teniente" had slept out their watch. The belated stragglers had experienced a terrible time in the storm, but they had managed to make pinewood torches, and had arrived at the shelter about midnight without any serious mishaps.

The coughing family turned out to be a young, amiably-inclined Indian with his wife and babies, who, for occasional services rendered, had acquired the rights of a lean-to squatter. He had put up against the lee side of the house a sort of verandah, with nothing but three raised boards and one mat to lie on, behind a smouldering fire. His household goods, a few calabashes and earthenware pots, were suspended from

THE HUNTER AND HIS FAMILY. OMILTEME.

the rafters, on which some fowls were roosting. The man was a hunter by profession, and one day a stag was brought in. Plentiful, indeed, to judge from the spoor in the forest, are the little white-tailed deer (*Cariacus toltecanus*),with antlers reminding us of our roebuck, and "jabali," the peccary. The "leon,"*

* The Aztec name of the puma, the *Felis concolor*, is "miztli" = the killer. Its small relative, the likewise unicoloured *Felis jaguarondi*, is the "cacomiztli" = crow-killer, but this same name is applied also to the *Bassaris astuta* and *B. sumichrasti*.

or puma, is shot by lantern light, the hunter in ambush attracting the beast to the spot by the sound of a primitive instrument composed of a hollow piece of bamboo and a string, which, in the hands of a native, can be made to imitate the note of a hind, or kid. These contrivances vary. For instance, near the coast of Guerrero they used, for alluring the tiger or jaguar, and also the doe, a three-inch piece of a stag's cannon bone with a thin film pasted over one of the ends of the tube; by sucking at the other end a squeaking note was produced. The lantern is, of course, intended to enable the sportsman to see the sight of his gun, and the reflected light in the eyes of his prey. The bluish, phosphorescent gleam of the eyes is, indeed, all that one can notice in a dark forest, but why the wild creatures are not frightened by the lantern instead of staring into it, is another question. Thus equipped, armed with a miserable gun and a machete, these Indians go out night after night until one of them is lucky enough to bring home the coveted "leon" or "tigre." The hundreds of failures are not recorded, whilst a single skin, which fetches about eighteen shillings in the larger town, and proportionately less in the wilder parts, is proof of the "abundance" of the "tigre," though there are not so very many, after all.

The deer of Southern Mexico are of two kinds. First, there is a little black-faced brocket (*Coassus rufinus*), the "temazatl" of the Aztecs, with small, unbranched antlers, or brockets, which stands twenty inches high at the withers, and seems to be restricted to the lowlands of the Atlantic States from Vera Cruz southwards. Secondly, the common deer (*Cariacus toltecus*), which ranges all over Southern Mexico, whilst in the north it is represented by, or merges into, the Texan deer. It is universally known as "venado," which means "chased," or "hunted"; its Aztec name is "mazatl, or "mazame." Although it has been hunted from time immemorial as the chief, if not sole, furnisher of meat, apart from the peccary, it is very common in the States of Oaxaca, notably on the Isthmus, and along our route through Guerrero. Its vertical range of distribution is enormous, from the coast to the snowline; but, apparently, it is nowhere found in herds,

but is always solitary, and prefers hilly or mountainous terrain. In the months of June and July the antlers were still small and soft, but by the middle of September we got them perfect, and clean from velvet. The rutting season of these deer cannot be much before October, since we never heard their cry. The season may vary according to the district; in the south of Morelos they were still big with young at the end of June, and twins were not uncommon.

YOUNG MEXICAN DEER.

This deer is subject to much variation in size, frequently standing three feet high at the withers, and the antlers of the adult also vary so much that quite a number of so-called species have been established. If we restrict ourselves to the

extremes it is easy to distinguish between two kinds, but a larger series, even from the same district, bridges over all the differences.

First type: the beams of the antlers continue to diverge, the distal points remaining, in large specimens, about ten inches asunder; the first pair of tines is short and straight, only two inches long, slightly converging, the tips remaining four or five inches asunder; then follows a long beam ending in two short tines, one anterior, the other posterior; at their common base the beam is slightly broadened, or flattened, but frequently, with age, this feature is increased into a distinctly semi-palmate shape, and a third distal, or posterior tine, is added. Such antlers are those from San Bartólo, still in the "hot-lands," but also from the plateau, near San Dionisio, south of Oxaca; these stags were rather small, but the largest pair of antlers of this type, with a greatest length along the curve of sixteen inches, I picked up at the tree-line on Citlaltepetl, at an elevation of some 13,700 feet.

Second type: all the tines are long and slender, especially the distal, and these are strongly curved forwards and inwards so much that their tips approach within a few inches, or even almost cross each other; there is not the slightest trace of palmation, even when a fourth tine is present. Stags with such graceful antlers as these we got also at San Bartólo and at San Dionisio.

The wild pigs of America differ from the rest of the swine tribe by their possession of a large gland in the middle of the back, whence oozes a strong, disagreeable scent; therefore their generic name of *Dicotyles*, *i.e.*, double navel. There are two kinds of peccary, both occurring in Southern Mexico, and subject to much local variation in size and colour. The *Dicotyles torquatus*, *s. angulatus*, *s. tajaçu*, is about one yard in length, and grizzled black and brown, with a paler stripe across the shoulder. This creature is solitary, and has a very wide distribution, from Texas all over Mexico, and far into Central and South America. In the Atlantic Mexican States it is known as the "jabali marino," or "jambamba."

The other kind, *D. labiatus*, *s. pecari*, is a considerably bigger

ANTLERS OF SOUTH MEXICAN DEER

animal, much more ferocious, and lives in droves of sometimes as many as three dozen or more specimens; it is, therefore, known as the "jabali de manado." Another name for it is "moro," as, for instance, in the State of Vera Cruz, but not much reliance can be placed upon this name, since in other parts the other species is called "moran," and "marino" is obviously a perversion of "moreno." This gregarious beast is easily recognised by its generally dark reddish-brown colour, whilst the belly, chest, throat, cheeks, and a narrow ring across the snout are white. The usual name of all these creatures is the Spanish-Arabic "jabali"; the Aztecs call them "coyametl" and "quapisoti," or wood-pig.

Omilteme lies at an altitude of about 7,000 feet, and the mountains are all covered with dense forest, chiefly various kinds of oaks and pines, mixed with arbutus and a kind of ash. Many sorts of brittle shrubs and herbaceous plants form the underwood, but most of the trees grow straight, their branches bearing long pendent lichens (*Usnea*), with much the same general appearance as the pendent *Tillandsias*, which do not occur up here. But there are other, upright *Tillandsias*, *T. cœrulea*, on the pine-trees. Self-binding vines creep vertically upwards on one side of the stem like our ivy, which is unknown in America, whilst other creepers, mostly bignonias, screw themselves upwards in right-handed twists towards the light in the tree-tops, where they branch out. There is the "bejugo prieto," the water-giving liana, and another "bejugo," also a bignonia, which during our visit in July, was just dropping the corollas of its trumpet-shaped blossoms, and turning the fern-covered ground into a yellow-spotted carpet, as one after another of the trumpets came spinning down. Orchids were not in season, but were said to flower during the winter months, when it does not rain, and when the mountains are not enveloped in clouds and mists. Most of those which we collected had already started growing, and therefore came to grief long before we left the country. In a moist and permanently gloomy spot stood a cluster of some half-dozen tree-ferns with stems more than twenty feet high, looking almost like palms. These, like most other tree-ferns, are not at all

tropical plants ; they love a moist, temperate, not to say cool, climate, and they flourish best in Mexico in what may be called the prevalent cloud-belt, where such occurs at an elevation varying from 5,000 to nearly 8,000 feet. The abundance of selaginellas and ferns, mostly maidenhairs, was something delightful to behold, and several dozen kinds could be gathered easily during a short stroll.

THE POSTMAN.

Higher up, near 8,000 feet, the forest became less gloomy ; there is some scrubby growth but practically no underwood, since even the small and spiny-leaved " encino," an evergreen oak, grows to a large size there. The other oaks, all with large and smooth leaves, attain great dimensions, but the " ocote " pines and the " oyamel," or *Abies*, are veritable giants, from

five to six feet in diameter, as straight as a mast, and may be a hundred feet high. Here and there one of these giants has outlived his time, lightning has furrowed and more than once set fire to the rosinous stem, and where this and its mighty limbs have crashed down a large space has been cleared for a new kind of vegetation to shoot up. Lupins, with woody stems seven feet high, appear on such a patch in numbers, as if they had been sown by man in a clearing of the primeval forest. *Orobanche* and similar parasites flourish upon the decaying stuff, and the piled-up heaps of rotten bark afford shelter for scorpions, scolopenders, snakes, and other "creepy-crawlies," which it would be futile to search for elsewhere, not because they are not there also, but because it is so hopeless to find anything in a virgin forest unless by mere accident.

The shade-loving plants disappear from such a clearing; maidenhairs give way to bracken; the brittle, aromatic red salvias yield their place to spiny, blue thistles, and to yellow coreopsis; whilst of creepers there are none, of course, except their dead and twisted remains, looking like ropes or strands of wire cable, either frayed out or still solid as the case may be. A few years later and all this is changed again. Young trees of oak and pines are growing up, quite a welcome sight, since in a tall forest the young generations have no chance, and are, therefore, practically absent. Shade is produced, and the stem of the late giant is transformed into a long ridge-like mound, overgrown with mosses and ferns, a trap for the unwary enthusiast to sink into up to his armpits.

It was pleasant up there on the tops of the southern sierra, which rises, everywhere covered with forest, to heights of more than 10,000 feet, as, for instance, the far-off Tiotepec, or "God-mountain," with its abandoned prehistoric mines, where a friend had picked up a couple of ancient copper axes. This forest-clad range of mountains, running from west to east through the State of Guerrero, has a considerable influence upon the geographical distribution of animals and plants. It forms, except for a break of the lower basin of the Balsas river, a continuation of the mountains of Colima and Michoacan, and thus of the western sierra. Thus is explained the fact

that there exists some similarity of life between this southern sierra and that of the western sierra and the central plateau. To the south of it is the "tierra caliente," with its flora and fauna of the typical Pacific type, which would be completely shut off by this same sierra from further inland, if this same tropical fauna and flora had not sent a good many forms upwards into the basin of the Balsas. Thus it has come to pass that in Guerrero, in the hot regions north and south of this sierra, occurs a similar fauna and flora, separated from their relations by semi-alpine animals and plants, which are not modifications of the tropical basal stock, but have spread along the sierra.

Of course we were busy collecting. From this Omilteme district are now known, in all, about twenty-two different kinds of amphibians and reptiles, and it is a curious fact that of the ten species found by ourselves only one, the commonest lizard, had been obtained by a previous collector, whilst we did not get one specimen of the eleven other ones brought home by him. That we stopped in this part only a few days makes this supplementary result all the more interesting, and it also shows how much such results depend upon luck. For instance, we did not see a single rattlesnake, although Antonio knew of two kinds on the "pedregal," a dry and rather barren slope covered with obviously volcanic rubble. High up, about 8,000 feet, on the pine trees, was *Sceloporus microlepidotus*, and on the ground *Gerrhonotus liocephalus* and *Eumeces lynxe*, a slippery skink with an azure-blue tail. A new kind of *Anolis* flitted about on the branches of a fallen oak, but more variety of life existed in the vicinity of the hamlets. An insignificant and diminutive toad (*Borborocœtes mexicanus*) lived in the irrigated patches of Indian corn, and emitted a sharp, double, piping note. One of these specimens was inside an orange-headed grass-snake (*Tropidonotus chrysocephalus*) caught by Rafael, the "arriero," who was much astonished when he received the promised pay for two instead of one creature caught. This ought to have been good policy on our part, but as an apt illustration of the working of the Indian mind, he never caught another thing during the following six weeks

for which he faithfully served us. Small toads were found under stones, and in the huts, and the common water frog of Mexico (*Rana halecina*) was plentiful in a pool that was difficult of access. So we fished for them, for lack of something better, with a bent pin and a bit of red paper, and then with the yellow flowers of a ranunculus, to which they took greedily.

The blue-tailed skink mentioned above is another instance of the difficulties of collecting. I saw one basking on a heap of dry oak-leaves, but although Antonio helped in the search for twenty minutes it slipped away three times, and all we got was the end of its brittle tail. Not having recognised the species I felt rather unhappy, and although it is supposed to be common enough in the mountains, I never came across a specimen elsewhere, until three months later, on the Nevado de Colima, my horse kicked out of the loam—another tail! Since this was close to our camp we searched and searched without avail, though in the evening one skipped away into a rotten stump. However, two days later we got several and saw many more. That is my experience of *Eumeces lynxe*. The specific name has, by the way, nothing to do with a lynx, but seems to have been something like the Aztec name of this little creature.

We have calculated the distance from Chilpancingo to Omilteme at nineteen miles, or six hours' steady riding. The little settlement chiefly owes its existence to its being a sort of half-way station between the town and the La Dicha mines further west in the mountains. These mines have recently been re-discovered, or, at least, taken in hand seriously by a company, after it had been ascertained that the district contained a fabulous wealth of copper ore.

CHAPTER XIX.

CHILPANCINGO TO AYUTLA.

Preparations for the Journey—Wet Camps—The Rurales on the alert—How Brigands are treated—The beautiful Pass of Los Cajones—Rapid Descent into the Hot Country and a Narrow Escape—Tierra Colorada—Crossing the Papagayo River—Camp amidst wild Mountain Scenery—Semi-Alpine Vegetation on the low Coast Range—A Prehistoric Carved Stone Slab.

Several busy days were spent at Chilpancingo packing and rearranging the many things preparatory for the journey to the coast, which we intended to strike somewhere to the east of Acapulco. These regions were, from a scientific point of view, still *terra incognita*, except as known to the ubiquitous prospector. A friend, for many years resident in Mexico, professionally a mining expert, mineralogist, prospector, inventor, temporary administrator, or owner of gold mines, collector of antiquities and insects, estate agent, and journalist combined, had pictured to me the prospects of a visit to the Copala district in glowing colours. In favour of this project was the fact that my friend had actually been there, and we might just as well visit this district as any other equally unknown to the naturalist. A considerable portion of the country had been acquired by a former Governor of Guerrero, who then, curious to see what his estate was like, had yielded to the versatile Irishman's suggestion of a joint investigation of its commercial prospects. Although the expedition was undertaken during the winter months, in the dry season, the grim old governor, who had the reputation of having condemned to death more evil-doers than any other governor of this State before him, paid for that trip with his life. We were to follow in his footsteps in the midst of the rainy season. The various

travellers who came to our inn from Acapulco, contractors, agents, and prospectors on the look-out for a job, had dire stories to tell about the unhealthiness of the season, the flooded rivers, and other dangers of the trail. Nearly all the inhabitants of the inland plateau have an exaggerated dread of the coast-lands. The occasional travellers, therefore, rush through, from the capital to the coast, or *vice versâ*, as quickly as possible, and thereby provoke the very dangers which they hope to avoid. Overtired, badly fed upon unaccustomed food, and with no time to adjust their systems to the considerable climatic changes, they arrive at the coast in prime condition for any kind of fever that may happen to be in season; or, the other way round, the change from the tropics to the tierra fria produces colds, with much gastric and pulmonary trouble.

Now nobody, the governor excepted, knew our real intentions; they were hazy even to ourselves, ready as we were to be guided by circumstances, or by what we might find; and, of course, nobody believed for a moment that we were not prospectors in disguise, or else bent on some mysterious errand. The lieutenant of the rurales reported himself ill the night before our departure, and was promptly confined to barracks, under arrest, and so there was an end of him. After all, he would have been more of a social nuisance than any practical help, and we were better off with our reduced escort, composed of a sergeant called Sabino, Pablo, a private, and Tranquilino, a corporal of gendarmes. By order of the governor we were to be provided with three riding horses and four strong pack-mules, complete, and Rafael was again willing to act as "arriero." But the start on Saturday, July 16th, was as annoying as could be. The "jefe politico," or commissary of police, had disposed otherwise. The mount kindly intended for my wife was a mule with a broken foreleg, which projected sideways; my horse had never worn a bit, and there were no pack-saddles for the four stipulated mules, one of which was a sorry horse, and the other a small donkey. It took many hours to put matters right, and the governor was rather astonished to see me again, as the commissary of police had just reported to him that we had left the town hours ago.

The stock of tinned provisions, brought from Mexico, had diminished sadly, and, to our dismay, could not be replenished at Chilpancingo. Still, we had the following stock: Nearly twenty pounds of tinned meat-stuff (sliced bacon, minced steak, chipped and very salt dried beef, and roast beef), four pounds of "force," rolled wheat and grapenuts, three pounds of dried apricots and plums, five dozen cakes of Maggie soups, a large tin of biscuits, and four large tins of proteine gingerbread, biscuits, and plasmon chocolate, with various little odds and ends. These stores ought to have lasted the two of us for three weeks, supplemented, as might reasonably be expected, by chickens, eggs, bread, tortillas, bananas, pineapples, and all the other tropical fruits, which are proverbially plentiful, let alone the game we might shoot. But it turned out otherwise, as instead of three weeks we were away thirty-five days, and suffice it to say for the present that the additional fifteen days meant a serious deficit of serviceable food. We cannot live on tortillas, and we cannot keep fit by feasting one day and fasting the next.

The track towards the south is bordered by a ridge which has thrown out spurs composed of boulders, sand, and small stones, looking like moraines. Once over the cretaceous ridge we pass through a pretty gorge, and gradually drop down to Mazatlan, a long and very dirty village, situated amidst fields of Indian corn, meadows, and grassy, low hills—a cattle-growing and horse-breeding district. Although scarcely a dozen miles from our start, we stopped in the neighbourhood, partly to break in our men to the mysteries of camp-life, and partly to change horses, the now cringing "jefe politico" having despatched two successive messengers to find out whether we were satisfied, to which he received such unfavourable answers that, on the following morning, the alcalde of Mazatlan established a little horse fair. Thus ended our troubles, with a loss of the three best hours of the day for travelling. We came in for a heavy shower whilst pitching our tent, the storm coming as usual from the south-east, but it soon passed northwards, settling down over Chilpancingo. The wind was cool on our exposed, bleak hill, and by early

morning several of our beasts had taken shelter on the lee side of the tent from the drizzling mist which, with a temperature of only 65° F., felt very unlike the tropics. Mazatlan means in Aztec the "place of stags"; but of living things we only saw the "sapo blanco," or white toad (*Hyla copei*), a tree-frog which spends most of its time on the ground, which it much resembles in its mottled brownish and white garb; small scaly lizards, a few "zopilotes," and (curiously enough) crabs, well out of reach of permanent water on the slope of the ridge.

An hour south of Mazatlan is Palo Blanco, the dirtiest of all villages, with still dirtier and unusually broad-faced people. The effect of the environment upon the looks of the natives is often striking. Here, at Palo Blanco, the white upper cretaceous formation joins the older hard blue limestone.

A remarkable tree is rather common in this district, *Juliania adstringens*, well-known to the natives as "cuauchalalatl" throughout Morelos and Guerrero. Lumholtz mentions another species, *J. amplifolia*, from Michoacan as "quetchalalatl," or "matixeran," in the Tarasco idiom; the sap, which spurts out of the bark, is used for curing old wounds, and a decoction of its bark contains an alkaloid, good for malaria. The fruition is most peculiar, growing at the end of a stalk, and looking like a green, attenuated fig, or like a malformed walnut. I much regret not having preserved any of the plentiful specimens, which seem to be at a premium in every herbarium, but I did not then know what a *Juliania* looked like. My humble offer to be on the look-out for certain plants had been chilled by the information that "the most interesting thing in Mexico is *Juliania*, but it would be of no use showing it, as *you* won't find it." Dr. Rose, of the Smithsonian Institute, has since been twice to Mexico to get material, which he has kindly handed over to Mr. B. Hemsley, of Kew Gardens.*

From Palo Blanco the track descends into a deep valley of limestone, the scenery changes to great advantage, and there are several rivulets which have either to be crossed or followed.

* "The Julianaceae: A New Natural Order of Plants." Phil. Trans. Roy. Soc., London, 1907, p. 169-197.

On the left is a large precipitous cliff, a pale yellow rock, part of which has the appearance of a colossal statue of a woman set in dark, luxuriant verdure. The proportions and the pose of the whole figure, the drapery, the position overlooking the wild valley, are altogether astonishing, and still it is only a natural freak. This is the famous "Imagen." Of course it is now called "La Virgen," the Madonna, but the natives call

UNDER THE AMATE TREE.

it "El Imagen de Acahuitzotla," and this is much more interesting and to the point, because Ahuitzotl was the last but one of the Aztec kings, a great warrior who extended his empire far to the south. The image commemorates his name amongst the Indians, who have long forgotten who Ahuitzotl was, and now give to the image the Spanish female gender.

Further down, at the bottom of the whole valley, is the large Hacienda de Alarcon, forming with its attached shop, where

fodder and drinks can be got, a kind of half-way house for the traveller before he crosses Los Cajones, the last ridge which separates him from "la costa," the hot country. We went a little beyond the hacienda, attracted by a spot with beautiful views of the sierras to the north and south, only three hours' ride from Mazatlan. It had been cloudy all the forenoon, with a noon temperature of 82° F. at Alarcon, which lies at an altitude of about 3,000 feet, but wise people said that thunderstorms were due in the sierra soon after noon, and we wanted to get under canvas without being soaked; but long before the arrival of the baggage heavy rain came down and continued during most of the night. The pleasant camping ground turned into a swamp, with countless rivulets. However, the men made the best of it by stretching out ropes from the tent-awnings and putting every available sheet and their own white regulation mackintoshes, etc., over the ropes, thus dodging some of the wet. Tranquilino, the gendarme, entrenched himself with his machete under the lee awning of the tent, and to this place he stuck during most of the time of our expedition, since, somehow or other, he considered himself the person most directly responsible for our welfare during the night. This living *en famille*, with all the men around us in the closest proximity, even within touch, was obviously safe, but had its drawbacks, since one cannot well prevent escorts or muleteers from talking, or, poor fellows, from restlessly shifting about. Their talking was always a good sign, and interesting information was thus gathered which would not otherwise have been forthcoming; but a quiet, talkless night boded ill—either they had fallen out with each other, or they had some grievance which, thanks to their reticent Indian mood, could never be set right until it was too late. Sometimes they had no food: that means to say, they had not bought any when told to lay in a stock whilst passing through a likely-looking village; or the Indian corn was more expensive than Sabino liked, so that his little margin of "profit" did not come up to his expectation; or, worse than all, a mule or horse was developing a sore, and this would throw Rafael out of gear.

I felt sure there was something up, thanks to some information which Sabino had received from the alcalde, and later on from people whom he had cross-questioned on the road. He would not let us ride in front nor in the rear, and stuck to us closely whilst Pablo kept his carbine ready " because of game." Ramon went quite to pieces, and croaked about this being an " awkward stretch of country." At last the reason came out accidentally, when Sabino could no longer hold in his reminiscences. He pointed out a place where three years before a stranger had been murdered by two robbers. It was an awkward-looking place, made for an ambush, at a turn of the path, in a ravine. " Here from behind that tree they shot him, and there we found the ' gringo ' lying. This is the branch on which we hanged the ' bandoleros.' " All this was very realistically told and partly re-enacted. In that case the alarm of the murder had soon spread to Chilpancingo, and Sabino happened to be one of the squad told off to hunt the murderers down. They had caught them two days later, near Rincon, on the other side of the Cajones, as that was the only place where a man making for the coast could have a chance of getting through, all the rest of the mountain chain being impracticable and uninhabited. Next he described how they took the murderers, according to " costumbre," to the spot where the crime had been committed, to be shot, and how the sergeant gave the *coup de grace* by a bullet into their temples, " because it is rare that a man is dead at once, but a bullet placed here always finishes him." Then they were " colgados," hung up on a tree, by a " lazo " passed under their arms, to be suspended for twenty-four hours according to law, as a warning to others, and as a proof that justice had been done. " But don't you hang them by the neck ? " " Certainly not. What is the good of doing that to a man who is already dead ; besides —" no es costumbre." " The truth is," said the gentle and refined Tranquilino, " that the hanging of a man by the neck may give a false impression as to his death, but when he is properly ' colgado,' everybody knows that it is not due to an accident, but for the benefit of the country, for ' la seguridad publica.' " This is certainly a somewhat summary method

of administering the law, but it is effective, and they did not quite follow me when I talked about subsequent inquests and possible miscarriage of justice. "No, my patron; our 'teniente' had orders to catch the two 'bandoleros,' and we caught them, prevented them from escaping again, suspended them, and took them to the Hacienda de Alarcon, where they were properly buried in the presence of the alcalde. There is no doubt about that, and we got our receipt."

Sabino owned to having himself only killed five men, but having "assisted" with fifteen, at least, up to the present. Then he became more communicative, and let out that they had now received information of a gang of robbers who were expected to be on the warpath between us and the coast, this being what made them uneasy. That this was not a groundless alarm we found out later.

Our escort was decidedly good, sometimes annoyingly so. Sabino was a quiet, often morose, but gentle-hearted ruffian; Pablo entered into the fun of the thing; but Tranquilino, a married man like Sabino, was essentially a man of peace. He was, as he often repeated, above all, "negociante," a commercial man, who in his spare time, to make both ends meet, had to do gendarme's duty. He was not keen about having to kill people, but he objected much more to the chances of being killed himself, and one day when things looked a little crooked, he confided to me what an incessant cause of anxiety we were to them. "If you or the Señora should get killed, we should have to fly, and where to? And then they (the Government) would send out 'the boys' to hunt us down and shoot us; and what would be the good of that to anyone?" Being really a quiet, trustworthy man, he had often been put in charge of well-recommended travellers, and he once had a close shave. The gist of his long and minutely-detailed story is that he once escorted a foreigner with a great sum of money. Both made a *détour* to inspect a deserted mine, of which the staging gave way, and they found themselves imprisoned for a long time. Supposing the stranger had broken his neck, how could his protector have cleared himself of the suspicion of foul play? Such little yarns whiled away the time, and helped to get us

over the ground, when the saddle seemed to develop creases, when the stirrup-leathers felt intolerably short or intolerably long, and when the longed-for camping-ground was still always just beyond the next ridge, whilst ridge after ridge followed each other in endless succession, each first looming out of a lovely hazy blue, then dancing in the broiling, trembling heat-waves, and then sinking back behind us into the same unpaintable tints as before. The hard-baked ground sends up a fierce, radiating heat, every stone glares, and every blade of grass appears with black on one side and white, sharply-reflected light on the other; but far away soft tints prevail and urge us on.

The vegetation of the whole valley between the ridges of Mazatlan and the Cajones is of great beauty. At the northern foot of the Cajones was a moist bank, or cliff, literally covered with climbing *Maurandias*, aroids, and a profusion of ferns, and every bit of projecting rock was studded with blue flowers, interspersed with white bulbous orchids, while at the bottom, between green-capped boulders, rushed a clear stream, with luxuriant, broad-leaved collocasias in its bed, fringed with the tree-like stems of the orange-blooming "morning glory," and a delicately-tinted grey convolvulus, while higher up, the slopes supported a whole forest of columnar cactus, and higher still grew the oaks and pines, with orchids, tillandsias, and fiery-blooming *Loranthus*. All this was as lovely to behold as it was difficult to ride through, what with boulders, water-holes, and the caved-in sides of the brook.

The ascent to the Cajones is steep, and this pass was, recently, the terror of pack-trains; but now a well-constru and serviceable road leads across the ridge—except whe happens to have slipped away. "Cajones" means bo and this term refers to the curious rut-like channels which the mule traffic of four hundred years, and before them, from time immemorial, the feet of carriers, had worn into the disintegrated soil. The whole ridge is partly overlaid with red rubble, or conglomerates, in sharp distinction to the northern parts, which are of volcanic, porphyritic formation. It has the appearance of a coarse red or yellow sandstone, but is in reality a

disintegrating kind of granite, soft enough near the surface to be cut with a pickaxe. There, especially on the north side near the summit, the old tracks had worn themselves into channels more than a dozen feet deep, with vertical walls, and so narrow that a mule could only just pass through, and one could still see the scratches which have been worn by the thousands and thousands of projecting loads as they scraped, struck, and butted against the walls ; and where such a little defile had become too deep, the rain-water rushing through it had dug it still deeper ; it was then deserted, and a new one was made. There were fights over the right of way, and the greatest danger was the meeting of caravans from opposite directions. The summit of this pass is only about 3,500 feet above the sea level, much lower than the main chain of the Sierra Madre del Sur, and thence southwards this volcanic formation of porphyritic andesite, and then granite for the most part disintegrated, extends right down to the Pacific coast, with scarcely any change or interruption.

The summit of the pass commands a glorious view towards the south. There are at least ten distances visible, near, middle, far, and still farther, with range upon range of cross views, all covered with forest, and becoming lighter and paler, until they fade away into the whitish haze of the horizon which imperceptibly merges into the sky.

The southern descent was steep, and the good zigzag road soon dissolved itself into a choice of the alternating banks of a stream. Whether it was that bit of unexpectedly easy road which had demoralised the horses or whether because everything appeared easy after the awful ascent, our horses began to stumble, and a fall of my wife's pony came within a hair's breadth of ending fatally. The young animal, not yet accustomed to the bridle, went slipping down sideways over a bare, slanting ledge, and threw her over the off-side against the opposite bank, with the usual result of dragging and kicking, till horse and rider lay in a heap in the triangular corner of a boulder-strewn stream. For a wonder nothing serious had happened, beyond some contusions and a terrible shaking.

The descent of 1,200 feet to the foot of the ridge, within a

LOOKING SOUTH FROM LOS CAJONES.

distance of less than three miles, brought about a striking change. It made all the mysterious difference between our being still in the temperate and just within the tropical region. There were still patches of pines, mixed with the "yellow oak," but hereabouts the "raspa vieja," a stunted, large-leaved brittle oak, more shrub than tree, became prevalent, together with the same "quautecomatl," which at similar elevations was so common on the open lands of Morelos. "Nanche" trees, with their cherry-like fruit, *Byrsonina cumingiana* and *B. cotinifolia*, and wide-spreading, shady fig-trees, of the kind called "amate prieto," and plantain groves surrounded the huts, which themselves, by their loose structure, the absence of clay from the wattled "walls," and their shady verandahs, proclaimed a warmer climate. Of birds, the long-tailed grackles (*Quiscalus*) gave vent to their metallic notes, swarms of little parrakeets whirled about, large and small *Pitangus*, and the funny black *Crotophagas*. For a few miles the country is flat, meadows with herds of cattle extending to the village of Buena Vista, a well-chosen name, and not far beyond we selected what appeared an ideal camping-place, though we had scarcely dismounted when the early afternoon storm burst and soaked us thoroughly, during the three-quarters of an hour's wait before the baggage came up. There was no joy in that camp; the carefully chosen spot was soon converted into a swamp, like the whole neighbourhood in fact, and it was hopeless to build a fire.

From Buena Vista the terrain descends steadily, the subsoil being the same volcanic rubble, sometimes in shales, while underneath lies the hard pale andesite, cropping up occasionally in high boulders, and, of course, in the river beds. Part of the way, in the worst and steepest places, the road had been paved, some fifty years ago. Here, in this awkward stretch of country, where the track wriggles up and down, twisting between rocks, streams and trees, many of the large cobble stones are still in their original, closely-packed condition, affording welcome foothold to the panting beasts; but where the stones have been loosened by the growing roots of trees, the torrential rains cause little landslips, or the road-bed is converted into a series

of harmless-looking puddles, maybe a yard in depth, and hiding the leg-breaking tangle formed by the roots of the neighbouring trees. Where the track leads, as it frequently does, under the caved-in bank of a stream, some unusually big roots, or a fallen tree-trunk, may block the passage, in which case it always amused us to see each man as he rode past such an obstacle deal it a single vicious blow with his machete. This is "costumbre," and when some scores of travellers have done their duty, it may be that the obstruction will sink down. But there are plenty of trees which bear hundreds of such marks, and on many of them the tropical growth has partly mended the oldest cuts, the track now circumventing the too persistent obstacle. Further on, near Dos Caminos, and again above Tierra Colorada, the track divides into many little "cajones," on comparatively flat ground, the various tracks having worn themselves so deeply into the subsoil that our mules had to be unloaded several times when the packages stuck, and it was impossible otherwise to extricate the beasts.

Tierra Colorada, well called the "Red Earth," is a large village built in the usual straggling fashion along either side of a broad, plaza-like space. On a knoll, well outside the village, we established our camp. There is much Indian corn grown, and there are many "platanares" here, but these are the only signs of cultivation. The neighbourhood was teeming with life; large blackish iguanas basked on the rocks, motionless, and half erect, like old jagged branches, while their grass-green young sat in the green trees or in the "yerva," tall weed-like masses of sunflowers, salvias, and other glabrous, aromatic herbs; striped lizards flitted through the grass, or played on the patches of red-brick coloured soil, representatives of *Sceloporus* were watching on the fences, anolids of various kinds, amongst them a large and beautiful new species, stretched out their gorgeously-coloured throat-discs, thereby alone giving themselves away; geckos, called "pata de bueye" because of their cloven finger-discs, swarmed in the houses, and there was a fair sprinkling of snakes, from the harmless *Tropidonotus* to the "vibora con cascabeles," the rattlesnake. Another large snake, a *Zamenis*, lived under a ledge just in front of the

PEARL EMBROIDERY, SOUTH GUERRERO.

tent, but refused to be dislodged, basked during our absence, and hunted in the evening. At the pretty little river were " pasarios " lizards, tree-frogs tucked themselves away between the stems and leaves of the plantains, and tiny toads muttered in the grassy swamps. Bird-life was also plentiful, particularly the hundreds of little parrakeets which, especially in the morning and in the late afternoon, whirled about in flocks of from twenty to forty, and filled the air with their exuberant shrieks. Little crested quails uttered their quaint notes close by in the dense copses near the cultivated fields, and now and then a *Crotophaga* fluttered past holding a limp lizard by the neck, to dissect it at leisure upon some horizontal branch of his favourite tree. There were also stags within a hundred yards of our camp, but of other mammals, as usual, we saw nothing.

The natives were not averse to collecting creatures when confidence had once been established, for which purpose we stopped here another day. Luckily, for me, there was much illness about, mostly rheumatism and cases of upset digestion, which were amenable to our stock of medicines. We had here an almost unique experience of an Aztec fulfilling his promise. A man had received some pills, and as he wanted to pay for them—which was quite an unusual occurrence—he was told that a snake would balance the account. In the evening he actually brought a nice specimen of *Trimorphodon biscutatum*, the only one I ever got in the country. He said there were several about, but he did not want any more pills that day. For a while trade went on quite briskly, until the tent was surrounded by the lame and the halt, a terribly palsied girl, some cases of goitre, which were rather frequent in this district, and other incurables. Then my reputation suffered; moreover, our animals ran into the fields of Indian corn, and damages were curtly refused by the sergeant. A crowd of women and children squatted about, hunting awhile for the game on each other's heads, till they had to be cleared off the premises; in short, relations became somewhat strained, and we remained on visiting terms with a few select families only.

It was very hot there, the elevation being scarcely 1,000 feet, and no rain falling. The mean shade-temperature hovered at about 86° F., which is quite hot enough to be uncomfortable in a stuffy valley without a breeze, and even by sunrise the thermometer still stood at 71° F. The evening was sultry

NATIVES OF TIERRA COLORADA.

and cloudy, and we experienced two sharp shocks of earthquake of about four seconds' duration, which sent cold shivers up one's spine. It must have been an extra strong shock, as it became the talk of the natives, who in this coast district are accustomed to almost daily "temblones."

In the afternoon several roped prisoners were escorted past our camp by some Federal troopers, and caused considerable

excitement, as they were supposed to be part of that band of robbers whom everybody had been on the look-out for. However, we heard later in Ayutla that there was nothing in particular against them, except that they were strangers who had loitered about in that town in search of employment, and the "jefe politico" therefore sent them to Chilpancingo as recruits for the army. He could not show his zeal for the

A TORTILLERA WITH HER IMPLEMENTS.

welfare of the Republic in a more tangible way, and, as the poor fellows had no friends, nobody minded.

Tierra Colorada was soon to experience bustling changes, as it is marked out for a station on the railway from Acapulco to the La Dicha copper mines in the neighbourhood of Omiltcme. At Dos Caminos the track divides, the "main road" continuing as the Acapulco trail, whilst the other, which we followed, branches off towards the south-east

and leads to Ayutla. Henceforth we were off the beaten track.

About seven miles south of Tierra Colorada the Rio Papagayo has to be crossed at the Paso de Omitlan. This is a formidable river which rushes through a deep depression in the hills, its bed lying only about 160 metres, or 520 feet, above the level of the sea. The narrow valley is a mass of tropical tangle, and on the south side rises a densely-wooded ridge. The ferryman on the other side kept beating with his fist upon the covered-in prow of the launch, and by the drumming sound thus produced summoned his men together. The crossing, as this is not a Governmental ferry, was rather expensive, our whole party paying about two-and-a-half pesos, but there is also a cheaper mode of getting across, much resorted to by the natives. Oxen are driven into the river, and whilst they are swimming against the current, which carries them obliquely down towards the other side, each passenger holds on to a tail. The oxen like to cross in company, one alone cannot easily be induced to do it; but now and then some self-willed beast makes for a shallow sandbank in the middle of the bed, higher up stream, and there the passenger has to wait until its bovine mind is made up whether to cross right over or to return to the bank of departure, to the howling delight of the boys who are in charge of this traffic.

Omitlan, a small village, is a filthy place, reeking of cattle, which wallow about anywhere under the wide-spreading "amate," or fig-trees, and the people are not attractive either. The temperature in this enclosed valley was 88° F. The origin of the name Omitlan, which means "place of bones," has puzzled others before us. On the southern side escape out of the valley seems to be absolutely barred by a densely-wooded ridge, which rises steeply. A crazy track zigzags through the woods, past the hamlets of Tepehuaje, and crosses the ridge some 1,100 feet above the river, to descend immediately, and as sharply, on the south side. Here we camped on a prominent spur, and did not tire of admiring the rather awe-inspiring scenery of the densely-wooded mountains, which seemed to form an endless labyrinth of ridges running from

RIO PAPAGAYO, NEAR OMITLAN.

east to west, each ridge sending out transverse outworks, coulisses, which screened the neighbouring ranges, and made it a puzzle to understand how the Rio de Omitlan, joining the Papagayo, could find its way out of such a labyrinth—in fact, how rivers could flow at all in such a country. Still, there they were, far below in the middle distance, while in the west, clad in dark purple above the green, loomed the high peaks of Omilteme, and even of the jagged Tiotepec—the mountain of the gods. The afternoon was cloudy, the temperature keeping agreeably near 81° F., and being still at 78° at 8 p.m.; heavy rain followed for several hours from 10 p.m. onwards; at sunrise the temperature was 70° F.

The following morning was cloudy, and a strong north wind brought a wet mist. The valley between this ridge and the next is thoroughly tropical, especially at the village of Coquillo, so-called from the abundance of the "coquillo," or "palma real"; but there were also whole groves, thousands of "cocoyul" palms (*Acrocomia sclerocarpa*), the hard seeds of which, two inches long, and pointed at either end, are of great commercial value on account of the oil; the kernels are also good to eat, but it requires a sledgehammer to open them. These palms grew chiefly on the slope of the mountains where they were exposed to the southern and western sun; everything else, except for the artificial clearings, was a dense mass of "raspa vieja," "amate," ceibas, "nanche," and mimosas, while the trees in the moister ravines supported arums and climbing *Cereus*, lianas, ferns, and orchids. Opuntias, mostly small and scattered, stood in the more open ground. There was plenty of life. The palm groves and ravines were favourite lurking-places of the "masacoatl," the "stag-snake," or boa, and the jaguar's existence was at least proved by the lovely skin of a female, which was to be had for eight pesos. A full-grown ocelot, or "tigrillo" (*Felis pardalis*), sat on a rock, and calmly watched us riding past within ten yards. Here were representatives of the large and small yellow-headed parrots, savannah birds, hooting trogons, doves, black and yellow *Cassicus*, crested jays, grackles, grey woodpeckers, auras, and hawks.

After having crossed the Rio Chacalapan, a clear and shallow tributary of the Papagayo, the village of Chacalapan, a curious place, was reached. Most of the few scattered houses have, instead of a verandah, a kind of awning spread over what might be called the court, palm leaves spread over lattice-work, supported by upright posts. There were also some ovens, like round bee-hives made of clay, with a hole in one side and raised a foot or two above the ground on a wooden

THE CHURCH OF POCHOTE.

stand with four feet. These funny-looking things are, however, not for baking bread, but for roasting patients. They are Turkish baths. A fire is lighted inside, and the patient crawls into the heated oven, which is just large enough to hold one person in a crouched position.

There was a shop where some bananas and fiery chili pods were for sale ; to encourage trade I offered to buy a pound or two of the coarse sugar which was displayed in little tiny lumps on the counter, but the woman was aghast at my greediness. " We sell here only ' al centavo,' and I cannot let you take my

whole stock away." But what happened? Every one of our men bought a few bits of sugar, the whole of the visible stock was cleared, and the woman calmly fetched some more from her real store. As usual, we had tried to break their custom, and maybe she was overawed by our appearance, but most likely it was a sample of the Indian mind which to us is as a book with seven seals.

Further on, higher up, near a pretty, clear stream, is the village of Pochote; well outside it stands the church, as usual with a tall, slender cross in front, erected upon a whitewashed pedestal. Like all the houses in this district, the church has a close stockade around it; some of the houses are quite neat, with proper whitewashed mud walls, thickly patched with palm leaves, and with a little cross at each gable. For some occult reason these gable decorations, or, more properly, charms against evil, are, in some of the other villages further north, supplemented by little clay pots in which is planted the tiny cross.

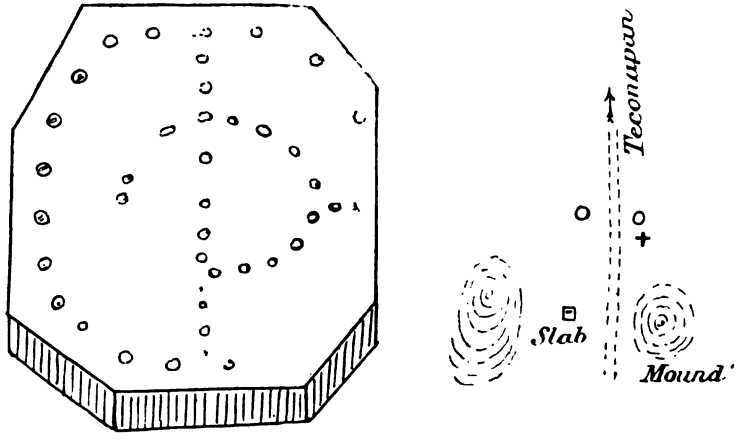
Beyond Pochote the road with many ups and downs ascends steadily, and crosses another ridge, the last parallel of the Sierra Madre del Sur, averaging about 2,000 feet in height. All the tropical life left us as we ascended the rolling hills, which were composed of disintegrated granite, sand, and yellow loam, and for the most part covered with turf, with here and there some stunted mimosa bushes, "raspa vieja," and "nanche," clumps of wood being restricted to the "barrancas." On the summit, after a ride of twenty miles, we camped on an ideal spot commanding views of the jagged sierra to the north and westwards, whilst towards the south the eye swept over the rolling downs. The general character of the country was strangely semi-alpine, as there was nothing in these turfy slopes to remind one of the tropics; on the contrary, the most prominent plants were such as one encounters in higher altitudes. On moist spots grew the large, orange orchid (*Cypripedium izaplanum*), which we had admired in the meadows above Chilpancingo; there was also in profusion the *Bessera elegans*; tall pink begonias, yellow asfodels, and mauve lupins; greenish-yellow orchids, reminding us of our *Conopsea*, and a kind of

dimorphic moonwort. Animal life was scarce, with the exception of numerous scorpions and centipedes, our spoils being restricted to a *Cnemidophorus* and some common frogs, while the only birds visible were a few " corre camino," or roadrunner cuckoos. Our enjoyment of this place depended upon the views and the fresh air, but, as usual, there was something to spoil the fun. This time the pack-train kept us waiting for five hours ; and when at last they turned up at sunset they had not brought a grain of food, whether eggs, chickens, tortillas,

SIERRA MADRE.

or maize, so that Sabino had at once to be sent back to Pochote. The difficulty was always in keeping the party together; when we ourselves went on in front with one or two of the rurales, the baggage-men were sure to linger behind in some village, not being able to resist its manifold attractions, and then they followed at a snail's pace. On the other hand, when the order of march was reversed, and we ourselves stopped for some sketches, photographing, or collecting, the baggage went on at a racing pace, so that when we had settled upon a likely camping spot they were miles ahead, and had to be recalled. It took us weeks to drill them into something like

shape, although they were willing enough individually, when not left to themselves, but with rare exceptions they could not be entrusted with the selection of a camping ground. The difficulty of uniting our few indispensable requirements was too much for them, namely, the combination of drinking water, firewood in the neighbourhood, and a dry spot commanding a view. Sabino was decidedly good at finding water; with unfailing instinct he made for the proper spot. Tranquilino had a hankering after dry ground and firewood, and Pablo



SLAB OF STONE NEAR TEXONAPAN.
Diameter about seven feet.

had an artistic eye for "la vista." But, unfortunately, these three men could never combine their gifts, and the other fellows were duffers.

This day, again, and the night were rainless; there was a heavy dew, and the morning temperature went down to 69° F., quite refreshingly cool. The road continued through undulating, open country, past the little village of Limon, down to the large village of Texonapan, amidst extensive meadows, with numbers of cattle, and huge "amate" trees, a stream amidst verdure making a pleasant change. To the south of this village —the name of which means "stone-river"—the road passes

by a number of stone mounds, about fifteen feet high, and there are two stout-shaped monoliths standing about four feet above the ground, which now serve as private boundary marks, and a little modern cross, erected there no doubt because of the now forgotten significance of this spot. Close by, between two of the largest mounds, lies a stone slab, cut hexagonally, about seven feet in diameter, and from eight to ten inches in thickness; the upper surface is quite flat, with many shallow little cups, or holes, cut into it; unfortunately, the design is no longer in complete preservation.

After an easy stage of eighteen miles, easy on account of the flat country and the low water in the various and extremely pretty rivers, our camp was once more established in "bush" country, amongst quails, parrots, and trogons, which hooted from morning to evening. There was not a breath of air, the temperature kept at 81° or 82° F. long after nightfall, and yet our notes say that "we enjoyed the cool night," because the atmosphere was dry. By 5 a.m., however, it had sunk to 71°, two hours later is rose to 74°, to hover at about 86° during the day.

Ayutla was said to be close by—the proverbial league; yet, although the road was very easy, and we did not linger more than fifteen minutes on the way, it took three hours' good riding to get there. This means a distance of at least sixteen kilometres, or ten miles.

HIEROGLYPH—MAZATLAN.
"Place of Many Stags."
Mazatl = stag; *tlan* = close together.
Expressed by two front teeth and red gums.

CHAPTER XX.

AYUTLA, AND THENCE TO THE COAST.

The Mayor, Schoolmaster, and other Misteca of Ayutla—Guests of the Municipality—Masked Dances—A Funeral—Scrimmage between Police and Robbers—How such a Wild State is Governed—The Land Question—Destruction of Forests—Ignominious Reception at Copala—The "Tarima" Zambos—Character of the low Coastlands.

Ayutla, the "tortoise place," we looked forward to as a haven of rest, a paradise of pleasures. It is a town of several thousand inhabitants, mostly western Misteca Indians and half-castes, the Spanish founders and settlers having long since been absorbed, although their influence, both physical and mental, is unmistakable.

The special letter of recommendation to the "jefe politico," contained, to our surprise, the thoughtful order that our party should receive lodgings and board. We were accordingly installed in the Escuela de las Ninas (the girls' school), it being at the time the vacation. A gang of prisoners was at once set to work to clear out the large class-room, and two men were appointed to act alternately as sentinels, messengers, and, let us say—valets. This school building forms a corner of the square which, according to the usual pleasant fashion of the country, is converted into a rather well-kept flower-garden, with a bandstand. Next to our corner across the street, were the "cuartel" of a detachment of Federal rurales, the prison, and, on the other side, "the ayuntamiento." The school-house itself was fortified, the verandah ending in a little round tower with loopholes commanding three streets. The back door led into a high-walled wilderness of a garden where a bull was

tethered. Here the escort and animals were installed. Our room was large and tidy, containing only tables and forms, and piles of school-books; all in excellent order, clean, and without earmarks. Sensible books, mostly dealing with Mexican history, geography, and the three "R's". Three were serviceable little atlases and maps, containing much practical information from a commercial point of view, and of the handwriting in the note-books the girls had no need to be ashamed.

We were scarcely settled, having just put up the mosquito-curtained beds and arranged the luggage, and, above all, sorted the many things which stood in need of washing, when the official visitors appeared to enquire what they could possibly do for us, with the mental reservation that they would do nothing at all, whatever happened! Of course, nothing came of it, but the "jefe politico," a decent fellow, carried us off to a private house, where a meal of many dishes had been prepared, and saw to it personally that we gorged to our sorrow. There was no denying him, and we enjoyed at least the sensation of being officially fed by an Indian municipality, or, rather, indirectly by the State of Guerrero. Unfortunately, this "jefe" had to leave the next morning for Chilpancingo, with a convoy of arms and money. He was scarcely recognisable, having been cropped short, like a criminal, as is the custom with people who go for a long journey, to promote cleanliness. This was a good, safe opportunity of sending back Ramon, who was, indeed, but a helpless creature. As no suitable and trustworthy servant could be procured for the journey to the coast, which they all dreaded like the very infernal regions, Sabino was promoted to the vacant post for more than adequate wages. Needless to say, a few hours later, the spell of his teetotalism was broken!

The schoolmaster posing as the learned authority, discoursed about the many things that he did not know, for instance, about the existence of a depression lying deep below the sea-level, between the town and the coast, a discovery which had been made by some traveller who, of course, had trusted exclusively to the readings of his aneroid. And there

are many people, even those who ought to know better, who think that this instrument gives the altitude without the making of any tedious comparisons and calculations. The fact that the streams, flowing through this very depression, still managed to reach the sea, made the present proposition all the more noteworthy. "It is a mysterious thing; as I told you, it is a wonderful fact." Except for the few men and boys whom we prevailed upon to bring in snakes, tortoises, and armadilloes, all of which were rather plentiful in the neighbourhood, we were thrown upon our own resources.

To the "teniente" of the Federal "destacamento," a very polite and dapper young man, we showed the order from the general commanding the forces, which gave me the right to ask for an extra escort wherever there was a detachment. Here it was advisable to make such a request, but the officer did not relish the idea. "The coast is at present very unhealthy; my men do not know the roads; their presence will only exasperate the natives, who are much given to internecine strifes, feuds, or vendettas." He illustrated his meaning by working his fingers together; the natives would mistake the appearance of his troopers for an attempt to arrest some of them, and it was his policy to leave them severely alone; in fact, neither himself nor his men had ever been in the district we wanted to visit, etc. Well, he is probably still sorry for his remissness!

Our two door-keeping attendants did duty for at least three hours, but after they had satisfied their curiosity, they misinterpreted the meaning of "alternate" attendance, and "alternated" so much that we never saw them again during the following three days. The style of our occasional visitors, even of those who considered themselves "swells," was somewhat lacking in ceremony. They burst into the room, made for a chair without invitation, spat on the ground, then made their bow and tried to open a conversation, which was soon brought to a conclusion, to their evident surprise. They were a mannerless, disagreeable lot, rather typical of the whole district, and remarkably different from the real, punctiliously well-mannered and unadulterated natives.

Then the principal grocer put in a ridiculously high bill for a grand supper which we never saw, and the purveyor of the first midday treat also clamoured for payment. Would they write down the items? Not they. Would the municipal chest sign the receipt? Certainly not, because "bills were too high." And the deputy mayor stood by, barefooted, one

A DEPUTY MAYOR.

of his cotton trousers tucked well up above the knee (as is the way with a hard-working man), and swore that he knew how to deal with these greedy shopkeepers, who were endangering the good name of the town. Thus ended our experience of municipal hospitality.

There were all sorts of shops, but, somehow or other, it was difficult to buy things at them. It was much worse than at Chilpancingo. Tinned sardines there were in plenty, but

the further off from the States, the older, and staler, and more frequently leaky they were. We wanted in this land of coffee to lay in a fresh supply, but, as I had not given a full day's notice, will it be believed that, after having tried several shops, I succeeded in buying only twelve centavos' worth, done up in as many bits of paper at a centavo each? It was very bad coffee, too. They would neither grind nor roast any more. Home-made cigars of good tobacco were plentiful and

IN PRISON.

cheap—"but," said the man, "there are 'palomitas' (butterflies) in them, and we have no others." Although nearly all were riddled by the larvæ of little moths, yet, when pasted over with cigarette papers, they were good enough to smoke. Some of our boxes wanted mending, but the tinker happened to be in prison. No objection was raised to his doing a little work there, but another inmate promptly seized the chance of making his escape through the armed sentinels, though the poor fellow

did not get half across the square. Most of these prisons consist of only one room, with a thickly-barred grating for window and door combined, giving upon the street. To this lattice-work the prisoners crowd like caged beasts, and there are always some friends, mostly women, to minister comforts, bringing food, cigarettes, and whatever kind of liquor happens to be the beverage of the district. The result is that the inmates are mostly intoxicated; apart from the indescribably filthy condition of these "black holes," they are treated kindly enough by their guardians. "Tequila" and "mescal," the spirit-product of aloe plants, went locally by the name of "vino blanco," in contradistinction to "aguardiente." Being in want of real wine, I asked for "vino legitimo," or for "vino de uva" (wine of grapes). "Vino de uva? What is that?" Well, those "falsificaciones Americanas." "Oh, Zinfandel? Certainly!" Unfortunately, Mexico is not a wine-producing country, and just as with us every wine is either hock or claret, so in Mexico red wine is labelled "zinfandel," after the very drinkable Californian product. The commissariat was indeed confronted with difficulties in Ayutla, and we did not fare well, except for the really excellent bread and fruit, bananas, zapotes, and, above all, pineapples and cocoanuts. Still, there was plenty to do and more to see.

On Monday, the 25th of July, St. James' Day, people were astir early, letting off little detonating rockets all over the town, and accompanied by a wonderfully quiet crowd, ten men, with masks, paraded from place to place to perform the dance of "buscar el tigre," the tiger dance, signifying the stalking of the jaguar. The ceremony, which was as genuine and heathen a performance as could be wished for, was marred by the dress, all the performers being in ordinary town clothes, excepting the headgear. Each wore a carved, wooden human mask, painted black, with slits for the eyes and mouth, but with certain characteristic attributes of goats and stags. For instance, one had a long goaty beard, topped with a brimless straw hat, adorned with horns of goats; another, representing a stag, had antlers, and stags' teeth surrounding the mouth. The tallest person was dressed up as a woman, in a white mask,

with long and thickly-plaited trusses of yellow agave fibres. The pantomime represented the search, the find, the stalk, and the kill, in a "tigre," or jaguar, hunt, and wound up with the appeasement of the ghost of the slain. We invited the actors to our verandah. None of them would speak a word, either before or after the performance, the only communication being by signs. The music struck up, and an old, one-eyed and one-armed man played the fiddle, the bow being tied to the stump of his forearm; this man represented the standing orchestra. One of the dancers had a gourd, over the top of which was

THE TIGER DANCERS.

stretched a piece of parchment, while from its centre rose a stick, which, when stroked with rosined fingers, emitted grunts. The woman played the rattles and tambourine combined, in the shape of the well-dried jawbone of an ass, stroking and scraping the teeth with a piece of iron, and then hitting the bone in time with her hand, so that the loose teeth rattled. This music went on during the whole performance, which lasted about twenty minutes. They began by arranging themselves in two opposite rows, the woman being at one end between them, and all dancing a slow polka step, or hopping on one leg, or shuffling. The stalking attitudes were exquisitely

droll and realistic. For instance, the stag crouched down, making his way through the underwood, eyed something, pointed at it, though hopping all the while like the rest, and then the woman, who represented the jaguar, suddenly emitted a deep growl, whereupon everybody growled too, and came to a dead stop. Then the same music began again, but with another dancing formation. The goat-boy next became the principal actor, his part being that of the dog. The next act

THE TIGER DANCERS.

was the shooting and, ultimately, the slaying of the beast. At the end of every act came a sudden "tableau," initiated by a growl from the woman. At last came the dance of victory and reconciliation, everybody in turn going through a solo recapitulation of his part, and advancing towards and retreating from the woman, who alone was all the time kept in motion. The meaning of this antique performance was not very obvious, it having no doubt drifted away from its original form, but the modern intention was to "felicitate and to ingratiate

Santiago." It was a "promesa" (a vow) to dance from sunrise to sunset, including four performances in front of the church. The padre had to draw the line somewhere; within the church they were not allowed, although there was a statue of St. James, the patron of the place, riding his white charger, and brandishing a sword, just as he does in Spain.

People who consider themselves in a scrape make a vow to go through this dance, but they are allowed to hire a substitute, so that some of the men have become kind of professionals. The whole thing is arranged upon business principles. The masks and the instruments belonged to a private person, who let them out, upon the advice of a syndicate, who could not be induced to part with them, the excuse being that the "mascaras" would be required a few weeks later for another festival. Now and then they made a pause, and they had a longer rest at noon, but long before sunset most of them were so pitifully exhausted that they, especially the boy, could scarcely keep on their legs. They were not supposed to take any money; an exception was, however, made in our favour, the old cripple being indicated as a safe receiver. After the spell had thus been broken, the tall "tigress" allowed a peso to be slipped into her dress.

All this time there was an opposition performance, likewise lasting all day. Fifteen men were dressed as "gachupinos": "gachupin" is still the universal, somewhat depreciative, name in Mexico for a genuine Spaniard. The origin of this term is said to be the following:—The natives' fancy was tickled by seeing the Spanish troopers spurring their horses, and they therefore called them "cat-chopin" (spiked shoes), which term they further bestowed upon the fighting cocks which were introduced by the foreigners, the native gallinaceous birds, their quails, "chachalacas," and turkeys being devoid of spurs. At any rate, the spur is the *tertium comparationis*, and a Spaniard is still a "gachupino," or "gatzupin," only you must not call him that to his face. About a dozen of these "gachupinos" were dressed in mediæval costume as Spanish foot-soldiers. Each wore a wooden mask, painted a pale pink or a dead white, with the unmistakable straight and long

Castilian nose, thick black mustachios and an imperial. The head-dress was made of red cloth, in the shape of a helmet, and was adorned with bits of looking-glass ; a red jacket, likewise ornamented with pieces of glass, indicative of the metal armour; they also had red tight knickerbockers, parti-coloured stockings and shoes. Each man was armed with a brightly polished machete. One man carried a tall pole, wound round with green cloth, with streamers, representing the " bandera," or standard.

THE DANCE OF THE MASKED GACHUPINOS.

The band consisted of a fiddle, and, as was more appropriate, a big military drum. They formed up in two files, the captain gravely holding two crossed machetes on his open palm, for two men to step forward and select their weapons for fighting a mock duel. When all had gone through this performance they went through various dance-figures, making a show of fighting at the same time. Then the swords were put away, and everybody took out a large green or red kerchief, flapping it in time and dancing, the white impressively masked and yet motionless

faces looking too funny for words. These people obviously represented the Spanish descendants of Ayutla, the conquering party, in opposition to the element of natives, who themselves had to adapt their Indian customs to those of the ruling patron saint as the only way of still retaining any vestige of what was theirs. Meanwhile, in front of the altar in the church there lay in state, in an open coffin, the body of a child. A procession

THE DANCE OF THE MASKED GACHUPINOS

of children, dressed in white, each with a fresh long stalk of sugar-cane, wended their way to the church to attend the funeral; the waving green tops of the plants were then left upon the grave and the children returned, eating with gusto the sweet stalks as they went. To them the solemn performance was thus rendered more agreeable, than if they had had to carry palm fronds in this land of palms.

We left Ayutla with misgivings: the replenishing of the commissariat had proved a failure, the promised gendarme,

who was to act as guide, was at the last moment converted into a messenger with a letter to the authorities of the nearest village to the south, and even he, too, escaped after a few hours when the pack-train got stuck in a swamp ; we therefore had to find our way alone to La Union as best we could, and there, besides

RIO NEXPA.

Indian corn and eggs, nothing was to be got. However, we camped in a beautiful spot on a wooded hill, with a view of the Nexpa river, which, after descending in cascades upon the left, wended its way through the swampy green lowland, now scarcely 100 feet above sea-level. Steady rain fell during the night, with much sheet lightning but little thunder, the lowest temperature being about 78° F., and the air saturated

with moisture. There were cormorants, snakebirds, and herons; the progress through the many mud-holes was slow; but a commandeered native proved helpful and did not run away. An official letter to the authorities at La Cruz Grande, the next halting place, fell flat. The presidente municipal, the alcalde, and the secretary were away on business, and we soon fell out with their somewhat impertinent deputy, force having to be used to get the requisite corn for the animals. Fortunately, near the camp there was a big swamp with "pichites," or tree-ducks, which had to provide the supper. Our rurales had little by little gathered from the villagers that some murders had been committed, between La Cruz and the coast, by some robbers, the very band whom we had been on the look-out for since Mazatlan, and it was whispered that the apparent zeal displayed by the local authorities was in reality a pretence, and that they themselves were implicated, and wanted to hush the matter up. The camp, which was away from the village, stood in a well-chosen spot in the centre of an open patch of ground, surrounded, however, by patches of wood, was soon put in a state of alarm. For once all the animals were properly tethered, and we went to rest prepared for emergencies, for the general behaviour of the villagers towards us was suspicious. We actually had an alarm, an attempt being made in the darkness of the night to steal the horses, some of which fortunately stampeded and thus roused us in time.

Now, what had actually happened in this district, and with what terrible consequences, we did not learn until some weeks later, and that, ultimately, from the Governor himself. There had been no murder near La Cruz, but a body of robbers had attacked a lonely house and wounded two of its inmates. This leaked out, and as it could not be hushed up, a detachment of Federals from Ayutla, the very fellows who refused to accompany us, was ordered to hunt the robbers down. Six of the band having been surrounded in a house, promptly shot down four of the soldiers, whereupon, brave as these troops really are, they stormed the house and slew five, the sixth escaping. Thus this hot scrimmage cost the lives of nine men, and the wrath of the Governor was furious.

But the account was not yet settled. The four dead rurales had still to be avenged. When the rainy season was coming to a close, and the swampy country became more passable, "troops," that is to say a large force, instead of the few dozen rurales permanently stationed there, were sent through the coastal district, partly to hunt up the missing sixth robber, and partly to settle other outstanding claims, but chiefly, no doubt, to show these "devilish" costaleños and their local authorities that there was, after all, a strong Government.

The difficulties of keeping order in such a State as Guerrero must be tremendous. Fancy a State of 22,000 square miles, one-sixth of the size of the whole of the United Kingdom, containing half a million inhabitants, and consisting mostly of a wild, mountainous country, without roads, and with the tracks often all but impassable during the rainy season, that has yet to be looked after by a few dozen State rurales and similar detachments of Federals, located in a few of the principal towns such as Iguala, Chilpancingo, Ayutla, and Acapulco. What can they possibly do for a place which it takes a week's hard riding to get to? And, as our escort no doubt rightly explained, you may as well try to catch a stag when it bounds away from the track, to which necessarily the troops are tied.

The efficiency of the usual letter of recommendation decreases at a ratio in proportion to the square of the distance from the centre of Government. The Governor himself can do no more than furnish a letter to the "jefes" of the various districts, who, in turn, copy out some of the best sounding and most equivocal phrases for the benefit of the village authorities, who, for their part, have not the faintest idea what it is all about. Most of the outlying districts are never visited by either the "jefes" or the Governor; they are really independent, self-governing communities, which, if left alone, behave according to their own notions. The difficulties are increased in the case of scattered tribes which do not yet speak Spanish. The public are never aware of a rising or a revolt going on, and it is only when all is over that the fact gets known, that some tribe or other, scarcely known by name outside the State, has been "reduced." Under the old Spanish *régime* the natives were

significantly classed as "Indios bravos, manzos, and reducidos." The "manzos" were, and in South America still are, simply those who are tame enough not to give trouble, but the "reducidos" are those who are broken in, "reduced" from their own ways to those of the white man and his Christianity. The most frequent causes of such revolts are the pernicious "concessions" often made to the white man. The natives are now passionately opposed to parting with their land, and in all fairness it must be said that not a square yard can now be "grabbed" in Mexico, if that land, whether private or communal, happens to belong to anyone at all. Now, what happens? A company gets a "concession," and endless litigations at once ensue. In many cases the very rumour of a surveying party suffices to excite a whole province. I know of the following case in Oaxaca. A piece of land had passed into the hands of a company after having been granted, and then nominally transferred and resold in order to obscure the title. There was a smart native boy who declared that he knew from his father that that land had not been private but village property, and he persuaded the villagers to stand by him. He went through the higher school at Oaxaca, thence to Mexico, where he studied law, all the while with the support of his village, and gathering up every scrap of evidence concerning the titles in question. He became a "licenciado," or barrister-at-law, and then fought and won the case, restoring the land to his own community; he is now a successful lawyer in the capital with a great Indian *clientèle*. It is extremely difficult to ascertain the possessions of a given village community. Whatever is, or has been, under cultivation, is consider the "property," as distinguished from what is "no man's land"; that is, leaving aside the question of ownership as between neighbouring village communities, a question which they know well how to settle amongst themselves. Regularly cultivated fields can present no difficulty, but a man may burn down a piece of "monte," *i.e.*, terrain covered with trees (the usual way of making a clearing), and, keeping this under cultivation for a year or two, may then move on to select another patch. Thus it comes to pass that the holdings of a village

community may lie many miles away, scattered in the mountains, and the same applies to the cattle ranches, or grazing-grounds, which are likewise continually shifted. Within less than a generation the process may be reversed, the new "monte," deserted for twenty years, is taken up again and so forth, so that real boundaries may not be in actual existence, though these rights, as established by tradition and custom, are clear enough.

The population of Guerrero, averaging twenty to the square mile, is sessile, but the village lands are rather amœboid, extending and retracting, by the forming of new and the desertion of old settlements. Much of the State, especially in the mountains, is still "no man's land," *i.e.*, it belongs to the Government, and can be bought at two pesos an acre. You can even get any quantity of it—say a few hundred square miles—as freehold property for nothing, if you will survey it. All throughout the Republic the surveyor receives one-third of such Government land, but there is a hitch about this surveying, which means not only the proper mapping out of unknown country, but also the thorough sifting of any prior claims, and the establishment of proper boundaries for any of the numerous village enclaves, or other already existing properties. Otherwise the state of affairs would be inconceivable. Moreover, many an administrator has helped himself during and after turbulent times of political strife, and has amassed huge estates for his present heirs. For instance, in Guerrero most of the valuable timber land has passed by now into private hands. The Mexican Government, now keenly alive to the threatened disappearance of their forests, finds it difficult even to check inconsiderate waste, and this is about all they can attempt to do.

From La Cruz Grande our party proceeded, with a new guide and at a snail's pace, through low, inundated forest, through mire and swamp, the warm, slimy water, coming well up over the rider's knees; and thus we kept on for hours and hours until dry ground was reached, where amongst "nanches," mimosas, acacias, and cassias, beset with glowing orange-coloured bunches of *Loranthus*, we pitched camp at last in sight

of the Pacific. The flat land below was apparently all covered with forest, excepting the mere swamps and the lagoons which fringe the coast. The number, size, and position of these lagoons vary according to the fancy of the map-makers; there are not two maps which agree in this respect. Most of the "costa chica" is fringed with such lagoons, some widely

THE GUIDE.

communicating with the sea, and therefore salty; others receiving a river, are brackish; others, again, contain fresh water, and form lakes in the rainy season, whilst in the winter they form a series of pools, swamps, or mud-holes. It is customary to divide the Pacific border of Mexico into the "costa chica," from Acapulco to the Isthmus of Tehuantepec, and the "costa grande," from Acapulco westwards.

We fared well at this spot, there being "chachalacas" and "conejos." The latter are not rabbits, but hares (*Lepus palustris*), if their non-burrowing habits may be taken as a criterion, though nobody uses the term "liebre." The view was lovely, and the sunset happened to be a most glorious one: first a blaze of colour over the Pacific, then a display of rapidly-changing hues over the forests and swamps, and then—"lights out." The "chachalacas," with their almost hysterical calls, the parrots and parrakeets, and whistling "pichite" ducks quieted down suddenly, while other and newer voices proclaimed the night. First, for a short time, as if only to bid us good-night, sounded the plaintive notes of the "piayas," or rainbirds, and then followed the cries of a family of "guacos," birds of prey (*Herpetotheres cachinnans*). "Gua-co," yelled the parents, and the children answered "Gua-coa," "gua-coa." A sudden yell, or scream, betokening some tragedy, produced a few minutes' stillness, to be followed by a din of many voices, and the process of warning, quarrelling, and settling down was repeated, the frogs and toads all the while keeping up a low concert of whining, muttering, barking, and snarling. All this was pleasant to listen to in the hot, rainless night, but there were other sounds and sensations enough to drive one to despair, and to curse the spot which, until then, had seemed ideal. This was the plague of insects, "zancudos," mosquitoes, and "chaquistles," which turned the camp into a perfect hell. It took several hours' work, distributed throughout the night, until the last of them had been killed within the mosquito curtains. Tranquilino was buried under his zarapes, indulging in a sweating bath; Rafael and Pablo literally spent the night in a performance resembling a "gachupino" dance, standing, as they did, all the night with flapping handkerchiefs; only Sabino slept soundly and without any cover. With the break of day the plague vanished like magic; not so the inflamed spots on the skin, which became worse by rubbing and exposure to the sun, together with the perpetual perspiration and—the next night's repetition of the same ordeal.

The village of Copala was in sight, on the top of a hill,

on the other side of the river. A reasonable-looking ford was found further down, and all went well except that a mule and the donkey rolled back whilst trying to gain the bank; they had to be unloaded, and all this trouble came whilst we were standing knee-deep in blue and yellow mud, which had been made filthy by being used as a wallowing-place for cattle. Soaked to the waist, begrimed with mud, and with dripping baggage, we made Copala by noon—Copala of the resources of which we had heard so much.

It was frantically hot, even under the trellis-work and verandah of the "ayuntamiento." The presidente, a tall, old man, evidently of Spanish blood, was the most insolent, conceited man of his kind which it had been our luck to meet in Mexico. Things became quite lively for a while, when he refused our party food and fodder. Our reception and his freely-expressed sentiments about the Governor and the President of the Republic were duly recorded, and it is a grim satisfaction to know that the tenure of this presidente municipal came to a sudden end. Clearly it was not advisable to stay at or near the place.

Under the verandah was kept a "tarima," a log of wood, about two yards long, in the shape of a turtle, with a rudimentary head and tail, flat on the top, and hollowed out below. Upon such a "tarima" people dance in couples, and the stamping of the feet produces a sound like that of a big drum. Such an instrument has never been mentioned or described; the only other specimen we met with was on our return journey at Pochote, where it had the same name, a word decidedly not Aztec, but possibly African. Our escort, as usual, could give no information. There may be such, and even other things still more interesting, in every village, but only accident will reveal their existence. Enquiries lead to nothing, and after all, what is one to ask for? The "tarima" in Copala was known to every man, woman, or child; it did not rank as a curiosity, and only inconceivably ignorant strangers like ourselves could ever want to talk about it.

Not in the best of temper we left this inhospitable spot in the heat of the day, to plunge again into swamps, which,

this time, consisted of meadows under water. The seashore was inaccessible, although only a few miles off. Camp was pitched near the tiny village of Cocoyule, inhabited by kindly people, with a strong mixture of negro blood. All along the "costa chica" this admixture is strong. The pure negroes have almost completely disappeared, at least we never saw any ;

NATIVE AND ZAMBO BOYS AT COCOYULE.

they have been absorbed into the brown Indians, and the resulting cross is not at all disadvantageous to the latter race. They are known as "mas cariñosos," or more amiable, far less sullen and reserved, and frequently taller and of better build than the other costaleños. The peculiar soft African skin, velvety to the touch, is retained, and the colour is a rich dark chocolate brown ; whilst the narrow hips, and, above all, the hair, which though a little longer, is yet still crisp and

curly, help to proclaim the African blood. The flatness of the nose and the prominence of the jaws have been much mitigated ; altogether they are often pleasant and good-looking, and bear a surprising resemblance to Melanesians.

Men and boys entered into the fun of collecting creatures in the neighbourhood. Although they spoke Spanish and

WOMEN OF COCOYULE.

had no native idiom, the hours of the day conveyed no meaning to them, and it was comical to watch how Sabino raised his arm and slowly twiddling his fingers indicated the sun's course and thus gave his orders as to time.

In this district eggs were not called "huevos." Our demand for such at Cocoyula was promptly met by the customary "no hay," or "not got," until an old woman, the one with the plaited hair in the photograph, said : "Oh, the

white strangers mean 'blanquillos,'" the "little whites" of the black hen, whereupon eggs were offered gladly. Is this not rather an instance of African thinking?

Although some of the natives were intelligent and willing collectors, none could be induced to attach themselves to our party for any length of time, rarely even for a whole day, since our doings were too "uncanny." So we went off with the sulky Copala guide, who led us wilfully astray. What he was after remains doubtful, but Sabino exerted a subtle, persuasive influence on such occasions by sidling up to me, looking more than usually dreamy and fumbling with his carbine. We had to return to the village, and then dived once more into the wilderness. Parts of the coast-land look like ill-kept parks. The slightly undulating, gritty ground is chiefly pasture-land, interspersed with small and large clumps of trees. Each clump, no matter whether it is only a square rood or several acres in size, forms an independent kind of plantation, having a few tall trees in the centre, with lower and scrubbier trees around them, the whole being bordered with an impenetrable tangle of bushes, thorns, and creepers, sharply divided from the lawns beyond, as if clipped and trimmed with an eye to effect, like the clumps fenced off from cattle in an English park. This symmetrical arrangement is only broken where the numerous brooks occur, the depressions between the ridges being there covered with an all but impenetrable swampy grove, where a track has to be cleared with the machete.

At last we heard the booming of the Pacific rollers, and soon came to the edge of a lagoon, the borderland of which, however, proved quite impassable. Back, therefore, we went into the gloom, where the periodically inundated ground, composed of deep black mud, was at least devoid of underwood. Yet there were other surprises to make progress difficult. None of the horses liked the gloom; they were always nervous in a forest, being natives of the uplands, and they were excited by the mysterious thunder of the waves. Every tree supported some creeper, mostly vines, such as *Vitis pterophora*, and these climbers sent down long brown, wire-like air-roots, some resembling mere packing threads, whilst others were like good-

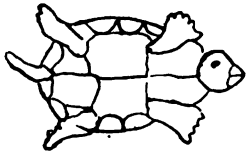
sized ropes ; some were still dangling loosely in the air, others were anchored to the ground by a profusion of small roots. Sabino in front slashed away at these pendulous ropes, which then fell upon and tickled the horses, or ensnared their feet. One of these anchored abominations got caught in the pommel of my wife's saddle, and her pony rushing forward, loosened

BOYS OF COCOYULE.

thereby the whole bunch of roots, so that the thing swung back, skimming over the ground like a black hairy beast, straight at my horse's legs. That much I had time to see, but then I was otherwise occupied, as I found myself lying on my back, rifle in one hand, reins in the other, and being dragged by the left foot through the mud until my trembling and kicking horse was in turn caught by some of those self-same air-roots. The Spanish stirrups often caused trouble. The shoe,

or rather wooden box, which here serves instead of our simple iron hoop, ends in a point, large enough to receive the narrow native shoe, but not a stout thick-soled European boot; moreover, the everlasting crossing of swamps kept leather and wood in a chronic swollen condition. It is no exaggeration to say that for some ten days our lower extremities were scarcely ever dry.

At last we emerged upon the narrow strip of dry land between the lagoon and the sea, and upon a promontory of granite we established our "Pacific camp," some fifty feet above the water, just out of reach of the spray.



HIEROGLYPH—AYUTLA.
Ayotl = Tortoise.

CHAPTER XXI.

CAMPING ON THE PACIFIC SHORE.

The Purple Snail—Heavy Nocturnal Thunderstorms—Cocoanuts and Short Commons—Crocodiles and Birds of the Lagoon—The Forest—Vampires.

It was the highest spot available, but as we had two years before just missed the tidal waves which wrought so much destruction at Salina Cruz, it seemed as well to be a little cautious. A shore with endemic earthquakes is not exactly safe. Providence had hitherto been very kind to us during our two journeys. We had each had a fall or two, or had been thrown, but had escaped drowning and fevers, and had only " assisted " at three railway accidents. The wilful running of risk would therefore have been unfair to our patron saint.

The camp commanded a glorious view. Curving in towards the east the coast was rocky, fantastic pillars of granite advancing into the sea, while the forest came here and there down to the water's edge. On the right was the open shore and the lagoon ; in the distance were high, yellow dunes, more forest, more lagoons, and a clump of palms. The never-failing attraction was, of course, the sea itself. Even when it appeared quite calm its long enormous, wall-like billows came rolling in, the nearest to rise to unwonted height, soon to turn over, and then with a hollow thunder to cover the foreshore all over with boiling foam, which then rushed back like a mill-race. Our men spent hours lying in the spray of the surf. Indeed, they had the best of it, being frantic with excitement, whether over the collecting of shells, which happened to be plentiful, or hunting for the eggs of turtles that had come to deposit them overnight in the dunes well out of reach of even the highest

waves. The whole shore was strewn with an astonishing amount of driftwood, mostly pines, which had been carried down by the rivers, so that we were well off for firewood, and could always keep big logs blazing throughout the nights. There were, also, whole banks composed of pieces of pumice-stone (where did they come from ?) and thousands of "ojos de venado," or stag's eyes, a most descriptive name for the seeds of the *Mucuna s. Dolichos urens*, a papilionaceous creeper, common in the woods. Some of these seeds grew, when planted

VIEW FROM "PACIFIC CAMP."

at home, none the worse for their salt-water voyages, and for having lain exposed upon the broiling, open beach.

The rocks were studded with *Purpura patula*, the same kind of shell-fish which at Tehuantepec is used for its purple dye. Ten full-grown snails yielded on an average 40 c.c. of juice, which, as secreted by the glands, is an opaque white with an opalescent tinge ; when mixed with sea-water it turns to a pale sea-green, and this is also the colour of the live shell, which sticks to the rock like a limpet. On exposure to the air for several hours, the fluid assumes its famous purple tint, and this is quite fast. We dyed a whole handkerchief by soaking it in the water with the juice of two snails. At first

it was a sickly green, but by the following morning it was purple, and it has retained its colour ever since, after several washings. The pure juice, kept in a corked bottle, is now, after three years, still of the colour of purple ink, and has not gone bad, but retains its dyeing properties. Consequently, this lovely stuff might well be collected and exported, if it were not for the cheap and nasty aniline dyes which are driving out the much warmer-tinted native products. What is the use of this juice to the mollusc ? It is true that it colours the shell grey-green like the algæ-covered rocks, but this can hardly be an advantage to the creature which, at the slightest alarm, sucks till it adheres so firmly that it can only be dislodged by a sudden, sidelong blow. At any rate, the lovely purple is a purely incidental effect, only the dead, stranded shells being of this colour.

A few hundred yards from the camp a little brook fell into the sea, and as it ran through a shaded cleft its clear water was agreeably fresh, that it to say, a few degrees less than 80° F. Here a jaguar was wont to come down nightly to drink and to prowl about in search of turtles, which these carnivores understand how to turn over, when they clear out the shell with their claws. We never saw anything of him except his big cat-like pugs in the sand. Naturally, after we had found the spoor, there was much talk about the " tigre," and Sabino jokingly went to bed with his machete. That night a squall and thunderstorm came upon us from the sea with unusual suddenness and violence, bursting open the tent and tearing out some of the pegs of the sun-flap, which then, with the usual noise, began lashing and crackling about. When one peg gives, others are sure to follow, so I crawled out, groping about in the pitchy darkness, and was soon lying down on the ground holding on to the ropes and the sheet, and yelling for somebody to come with the mallet. Sabino was ready in the twinkling of an eye, prepared to do execution upon my own body. They all felt sure that the " tigre " was upon us, when I shouted : " Hit quickly, I cannot hold on much longer." A flash of lightning lighting up the scene saved the situation, and we turned in completely drenched.

Some of these nightly thunderstorms were really fine displays. The whole day long there might not be a speck of a cloud in the sky; then came the glorious sunset, and the cooking of the evening meal, with the men grouped round the blazing logs, and an hour's chatting and dreamy taking of it all in, we lying in front of the tent under the southern sky, and "unheating" ourselves in the comparative coolness of the tropical night. Far away on the horizon, over the ocean stood a blackish-blue bank of cloud, out of which came lightning, flash upon flash, but so far off that the thunder was inaudible. The bank rose higher and higher, and the guns of the celestial artillery were obviously being brought into position. There matters sometimes stopped, and we enjoyed the finest display of fireworks and sheet-lightning ever witnessed; but when the blackness rose up to, say, half a right angle, then within a few minutes the rest of the sky became grey, the stars went out, the sea rose in angry, lurid white crests, an explosion or two overhead shook the ground, and a perfect pandemonium broke loose. Flash and clap could neither be counted not distinguished, the wind tore at everything, and the rain came down with as much force as if squirted out of a fire-hose. Our toads and frogs in their cages invariably chimed in, and thus the din went on for an hour or two, sometimes well into the small hours of the morning.

One night the sheet lightning was so vivid and continuous that one could read a book by it, and we did this just to be able to say we had done it. These rains were not at all refreshing, although they cooled the atmosphere a little, which, in the daytime, hovered between 86° and 88° F., rising for a few hours to 92°. On clear nights heavy dew fell, and the air cooled down to 74°. But immediately after the rain had ceased it rose again like steam from the baked ground, and everything became soaked with moisture; and, a sure sign of the saturated condition of the atmosphere, our clothes did not really dry even in the hot sun. The beds were soaked, the damp crept into the panniers, the paper got so limp that the ink blurred on it, and all our pressed plants became mouldy. Our scanty store of provisions, already sadly shrunk, was further reduced

by this moist heat. The packets of " grape-nuts " and " force " contained nothing but a brown and green fungoid growth; some of the tins started leaks, causing the putrefaction of their contents; the coffee gave out; and both the boiled rice, intended as a substitute for bread, and the cigars with the " butterflies " in them, had to be roasted at the fire.

Still, some food was procurable even in this solitude. We shot " pichite " ducks until they became too shy, and in the western distance we espied a clump of cocoanut palms, trees which indicated the proximity of a settlement. There were two huts, with a little cattle ranch, and some pleasant people, who supplied us with a few eggs, nuts, and tortillas. This was most important, since at this lonely camp our men had to be fed by us. The owner was a bit of a sportsman, and his dog was a trained " iguanero," that is to say, he pointed to, and retrieved, the black, whip-tailed iguanas. They, and the servant, a Zambo, became our established camp-visitors. Cocoanuts, when fresh and just in their proper green condition, are refreshing and nourishing; moreover, the so-called milk is the cleanest fluid procurable. Still, they, too, have their drawbacks. For a thirsty man, one is not enough, and more than one are liable to cause a slight squeamish sensation. Besides this, they are, when in their green husks, very heavy, so that in our case a supply anything like sufficient for a day was as much as a foraging party could carry.

Between the camp and this lonely " rancho " was the lagoon, which would have been our show-place had we had to entertain friends. It was a good-sized stretch of water, surrounded on three sides by swamps, clumps of reeds and dense forest, accessible only from the narrow neck of grassy and sandy land which separates it from the sea. The best time for a visit was the late afternoon and sunset, but for the myriads of insects which, one kind after another, were then turned loose to prey on the traveller.

A stretch of pebbly shore was the favourite basking-place of crocodiles. One skull measured twenty-three inches, and there was an old bull with a considerably larger head, who, to my disappointment, managed to roll away, although hard hit.

These creatures looked exactly like black, scorched logs, scarcely distinguishable from the muddy soil upon which they crawled, with extreme caution, to bask with their heads invariably turned towards the water. Their senses were very keen. Sometimes they moved off when we were still three hundred yards away; sometimes, when floating, with only part of the head exposed, they sank at once at the slightest motion on our part, and a long time passed until, further out, there was again a little ripple in the water, where the tip of the nose and the eyes once more appeared. Only when taken by

THE LAGOON.

surprise, as, for instance, when discovered behind a belt of reeds, they dived with a splash of the tail. The only way of getting at them was by crawling, like themselves, upon the belly, taking advantage of any intervening rise of ground or of cactus shrubs. Their young ones were far less cautious; several times they scuttled away almost under our feet from the raised tussocks, or floating masses of reeds, upon which they had been resting.

The thickets of reeds and rushes were full of shrilly-chattering grackles, which collected there like starlings for the night. They had a curious way of flying with their long tail-feathers turned up in a vertical position, out of the plane of the rest of

the tail. Tiny green and brown bitterns stood there in ridiculous attitudes like badly-stuffed specimens, with head erect, bill pointed upwards, and their yellow gleaming eyes fixed upon us, behaving as if we did not see them. The "yellow gleaming eye" sounds rather like a poetical invention, but these creatures were so free from shyness that they could be approached within half-a-dozen yards, so long as they stood within the reeds; almost as trusting were the wood-ibises (*Tantalus loculator*). They waded about in pairs, less than a yard asunder, stirring up their prey, water-snails and the like, with their feet, and driving them before them, at the same time deliberately poking the shallow, muddy water with their long curved bills, and working their way towards each other. The resplendent white herons or egrets, both small and great, and the rosy spoonbills were much more shy, and after their first day's acquaintance with us settled in inaccessible places, where also lurked a few of the odd-looking boatbills (*Cancroma*), the diminutive counterpart of the African giant, the *Balænirps*, or whale-billed heron.

Parts of the lagoon were covered with water-lilies, or *Nymphæa*, upon the floating leaves of which vociferous "parras" were running about. We did not hurt any of the inmates of this birds' paradise, except the "pichites," and this we were compelled to do by dire necessity, and few of these had their full complement of toes, having been bitten either by crocodiles or by the *Cinosternum* tortoises.

On the seashore there was but little bird-life; only pelicans sailed up and down, their mottled brown young being already fully fledged, leaving the nests in the mangrove swamp deserted. Already on our second day there some turkey buzzards, or "auras", called to inquire whether any scavenging was required, and then remained eking out a subsistence by inspecting the shore during the ebbing of the tide. Swiftly-running shore-crabs were abundant, and they were so quick that nobody could outrun them, not even young Pablo. They sidled away at a great rate for perhaps fifty yards, doubling and swerving, and all the while making for their private holes, very rarely diving into the sea, although this seemed the most

obvious thing to do; and when the worst came to the worst, or when really hard pressed or surrounded, these comical creatures stood at bay and shook their fists at the pursuers. On the other side of the camp, towards the east, where rocks prevent the accumulation of a foreshore, or of dunes, was a mangrove swamp, with its ugly tangle of stilted roots standing in the brackish water; besides being a pelican nursery, this was the home of countless hermit crabs, a source of boundless astonishment to our men.

The forest brought with it some keen disappointment, not that it was uninteresting, but because of its very peculiarities. It rose like a wall, impenetrable, and an entrance had to be cut through the mass of " felted " verdure, and even when inside, we still beheld an abominable tangle of air roots and nothing underfoot but gloomy mud (without any underwood), while on the rising ground, the vegetation was so abundant that we could not proceed without further slashing and tearing. This was not only a tiresome process, which kept one man always busy in front, but the noise frightened away, or into hiding, every living thing from the jaguar to the gecko.

Sabino, the friendly hunter, and myself, exhausted ourselves in this fashion with trying to work our way on to the " cerro del tigre " without getting near the top, which was reported to be less densely wooded. Our half-day's spoil was an iguana, which was again set at liberty, one *Ameiva*, some *Cnemidophorus* lizards, some little *Leptodactylus* toads and geckos, some *Phyllodactylus tuberculosus* of rather unusual size, and the rare *Coleonyx elegans*, a typical forest gecko. As a rule, geckos are not addicted to living in dense forests; they prefer houses, plantations, or trees in open country; and yet these *Phyllodactylus* lived in the dark parts of this forest, making their homes in hollow trees. They were rather difficult to catch, as they worked their way upwards when alarmed, in the style of most arboreal lizards. Just above a man's reach they stopped, flattening their lichen-coloured skin against the similarly coloured bark, their glossy eyes alone giving them away. With patience and some trouble the horse would then be brought up against the tree, one of us would climb into a

standing position on the saddle, make a dart for the gecko (which was sure to dodge round like a flash to the other side of the stem), and then the horse as surely would jump away from underneath its rider.

Amongst many other kinds of trees there were fine mahogany and ebony trees, the latter here called "jébana," or "liebana," instead of "ebonía," while on the banks of the brooks grew very spiky palms and cycads (*Ceratozamia ghisbrechti*). It was tantalising to be inside that forest where nothing could be got at, with plenty of life in, or, rather, on it. Take a bird's-eye survey from the little knoll at our tent, of green tree-tops, both dark greens and light greens, large leaves and small leaves, crowns of palms, and the masses of trumpet-shaped flowers, yellow, purple, and mauve, which attract swarms of butterflies, sought after in their turn by birds, swift anolids, other lizards, and green frogs, which themselves are stalked by the tree-snakes. Take your fill of this sight of lovely things, so near and yet so far. Only a few hundred yards from the camp stood a gigantic tree covered with hundreds of large white blossoms, but we never could find that tree, and if we had, the flowers would have remained out of reach. Perhaps the most curious feature of this forest was, that one could, to a moderate extent, at least in theory, walk right on to the top of it. On the drier, rocky ground, and where exposed to the sea winds, the trees became smaller and smaller, and there were especially some hard, scraggy sorts which had interlaced their flattened branches so firmly and densely, that at the back of the tent we could actually walk for a few yards upon the top of the springy mass, say six feet above the ground, and this plaited roof rose by degrees, and continued till it was merged in the veritable forest.

Whilst we were plagued by insects, all the horses suffered from vampires, which selected the neck for their bites, causing profuse bleeding. As the flow of blood continued so long, and as the little sharply-cut wounds were not stopped by coagulation, I cannot help suspecting the presence of some special properties in the saliva of these bloodsuckers. One of them flitted in and out of the tent, but I vainly tried to

attract him by keeping my bare feet out of the curtain, the belief being that these " sanguesugas " make for the big toe.

There are only two kinds of the real vampire, or blood-sucking bat, in the world : *Desmodus rufus*, with a range from Southern Mexico to Argentina, and *Diphylla ecaudata*, a rare inhabitant of Brazilian forests. Various other kinds of bats have been suspected of blood-sucking, but one after another has revealed itself to be a harmless fruit-eater, such as the *Glossaphaga*, with its long rasping tongue, or *Vampyrus spectrum*, of tropical America, which is libelled by its scientific name. All these creatures belong to an exclusively American family of bats, the *Phyllostomidæ*, easily characterised by their possessing three joints on the middle finger, while all the other families have but two phalanges.

The two blood-suckers are specially fitted by adaptation for their bloody habits, which require them to hang on to their unwilling victims. First, they have no tail, and no, or only a short, membrane spread between the thighs, the chief use of such a sail between the legs and the tail being the catching of insects during flight. The rather strong and well-clawed hind-limbs are thus left free and unencumbered, although *Desmodus* has, for some occult reason, retained part of the membrane between the thighs. Secondly, the thumb is unusually long and strong, probably to enable it to be hooked well into the skin of the victim. Thirdly, the dentition is much reduced in respect of numbers for the benefit of the single pair of upper incisors, which are transformed into a wonderfully effective cutting instrument. These two teeth stand close together, are very large and triangular, with sharp edges, and fit into a shelf-like depression on the under jaw immediately behind the diminutive lower incisors. Both lips are thin, and form folds at the angle of the mouth ; probably the thin flaps are neatly pressed around the wound during the act of suction.

The exclusive blood diet of these creatures has brought about an absolutely unique modification of the stomach. While the œsophagus is such a narrow tube that nothing but fluid, blood, can pass through it, the stomach is transformed

into a long, left-sided, blind sac, which is several inches in length, and coiled up upon itself.*

Desmodus, a somewhat stoutly-built bat, about three inches long, with fur of a red-brown colour above, and silvery below, represents the perfection of the species, and this is indicated by its enormous range. *Diphylla*, on the other hand, may be looked upon as a failure. It is rare, with an apparently restricted range, and its molar teeth are not so much reduced, not that these relics do it any harm, but they are signs of deficient specialisation, and there are probably other not very obvious, yet significant, points in its organisation.

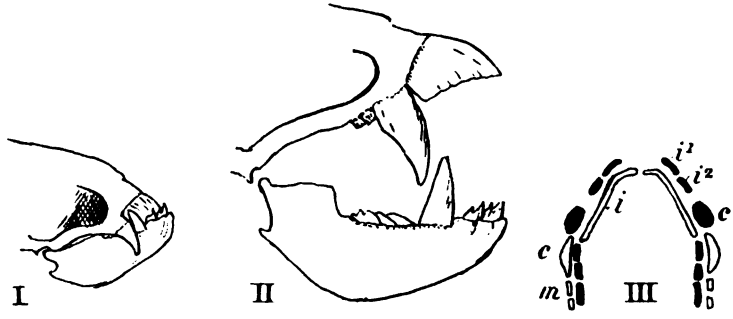
The peculiar blind sac of the stomach of *Desmodus* is not quite unique, since there is an indication of it in the closely allied *Brachyphylla cavernarum* of the West Indies, but we know nothing about its habits.

To trace the correspondence between the changes in the dentition, and those relating to habits and diet, from feeding upon insects to fruit eating, and, lastly, to the sucking of blood, forms a little chapter in evolution, which seems not yet to have received due attention. The primitive insectivorous bats had three pairs of upper and lower incisors; this number is still repeated in the young of *Desmodus*. The majority of bats have only four upper and lower incisors, prominent sharp canines, and a variable number of multi-cusped back teeth.† In some of the fruit-eaters a few of the upper and lower teeth are broadened, and have a chisel-shaped edge, well adapted for scraping the hard rind of fruits. The detail is variable. In *Vampyrus* the upper incisors and the canines are enlarged, and play upon the much enlarged lower canine. The other pair of upper incisors is squeezed into a corner; doomed to decay, it is neglected for the benefit of those upon which falls

* Huxley, "Proc. Zool. Soc.," London, 1865, p. 386-390, with figure.

† I purposely use this term for the so-called molars and premolars or grinders. It has become fashionable to call them "cheek-teeth," which purports to be a translation of the German "Backzaehne," but this term means literally "back-teeth," those which stand back, not in front, and has nothing to do with Backen or cheeks. A girl in her teens is jocularly called a "Backfisch," namely a fish, which, being still undersized, is thrown "back"; that, again, has nothing to do with cheek, although such a girl may be "cheeky."

the main function. *Brachyphylla*, which seems to be a link between vegetarians and incipient blood-suckers, has the pair of upper front incisors enlarged and triangular ; standing close together they form a cutting tool. In *Diphylla*, which may be called an improved blood-sucker, the upper incisors are restricted to a single pair, but this is much enlarged, and plays upon the broadened lower incisors. Behind the strong canines are three back teeth above and four below. Lastly, in *Desmodus*, the perfected blood-sucker, the chisel-like implements are still larger and broader, occupying almost the entire space



DENTITION OF THE VAMPIRE (*Desmodus rufus*).

I. Mouth closed, showing the overlap of the teeth.
II. Mouth opened.
III. Diagram showing the relative position of the teeth when the mouth is shut. Upper teeth, white ; lower teeth, black.

between the canine fangs, and they do not play upon the lower teeth, but upon a shelf of the under jaw, and against their inner sides. Moreover, these lower teeth are double cusped. and leave a gap between them for the reception of the triangular edge of the chisels. The back teeth are reduced to two pairs above, three below. The action of biting is probably carried out as follows : The four canines act as fangs, or hooks, in the skin. The lower front teeth scoop up, and forwards, a piece of skin, and the two trenchant chisels cut it off clean at one blow. The wound is not a punctured hole ; it always presents the appearance of a neatly cut-out piece, which then bleeds profusely. The whole act is probably instantaneous.

A *Desmodus*, when caught, inflicts precisely the same kind of wound upon one's finger. It does not bite and chew like any other bat, but it literally snips a bit of skin out. Horses and mules are invariably attacked on one of the two spots which they cannot reach with their teeth, legs, or swishing tail, preferably on the withers, and in the morning the blood is seen to have run down the shoulder and forelegs. The other favourite place is the neck, an inch or two below the mane; these wounds do not matter much, while those on the withers are liable to become inflamed through the irritation of the saddle. Sometimes a horse is bitten by several bats—at our Pacific camp every animal received three or four wounds every night. The few ounces of blood actually sucked can, of course, easily be spared, but as these scooped-out wounds bleed so profusely for several hours in succession, the repetition of the process is rightly supposed to have a deleterious effect; moreover, the poor creatures are very restless when these blood-suckers are about. The continuous bleeding—for the blood does not coagulate upon the wound—reminds one of the bite of a leech, and possibly the saliva of these bats has a similar specific effect. There are, however, no especially enlarged glands within the mouth; a pair of little glandular cushions between the eyes and the rosette-like membrane of the nose, opens by several ducts well outside the mouth. Whether their secretion is rubbed upon the wound immediately after the bite, is unknown. No trustworthy white man has ever observed the entire action of attack and sucking, although this must require some considerable time. My own impressions are as hazy as the accounts of the natives. The horses are restless, they flick their tails, jerk their heads, shake themselves; bats of some kind or other flit about amongst the never-absent insects, and at best you fancy that you see in the moonlight a shapeless, neutrally-coloured something, which is more than a shadow, hovering over the horse, or a dusty patch resting upon its coat, and when you move the spectre is gone. Sit up to watch, keep perfectly still, and never mind the tiny abominations which collect upon your neck and wrists—"Ya no vienen las sanguesugas"—"Now they won't come, the blood-suckers," says the "arriero,"

and you turn in. By the early dawn every one of the horses is bleeding. These bats frequently enter the stables, even in the towns; they are also said to come into the houses and to attack people, but—we need not sift the evidence. There are mysteries enough about the vampires. Horses and mules were victimised as soon as these animals had been introduced by the Spaniards, both in Mexico and in Peru. Cattle are not attacked, and I have never seen the characteristic signs upon the thin-haired bulls or cows of the "hot-lands." Maybe that, as these cattle can reach every part of the body either with the tail or the tips of their horns, they are unpopular with the bats, as well as their hornless calves. What, then, were the natural victims of these bats before horses, mules, and cattle came into the New World? They must have been good-sized mammals, scarcely birds; I can only think of the various kinds of deer, and it is reasonable to suppose that with the introduction of horses the range of *Desmodus* has increased widely, even beyond the "hot-lands," for instance, to Cuernavaca, and to the mountains of Omilteme.

CHAPTER XXII.

THE RETURN JOURNEY BY SAN LUIS ALLENDE.

Swamps and Inundated Forests—The People of San Luis Allende—A Funeral—Our Landlord's Family—Trading in Animals—A Glimpse at the Land of the Tlapaneca—Impassable Trail—A Heavenly Camp—The Village of Miahuichan—A Vine-bridge—Wooden Masks—Religious Dancing Dress and Rain-makers—Rank Weeds—Camping Troubles—The "Mal del Pinto"—Native Doctors—A Plea for Native Dispensaries—Prevalent Diseases—Camp on the Pass of Los Cajones in a Thunderstorm—Settling of Accounts at Chilpancingo—Motmots.

Short commons drove us away from our "Pacific Camp," and we plunged once more into the forest, following a track pointed out by our friends. Progress became more difficult than ever, as beyond the Cerro del Tigre much of the forest was under water, and for hours our beasts had to flounder through it, often well up to the saddle, so that we were glad to reach La Salina without any accident beyond the soaking of some of the luggage. There were many *Cassicus* nests, built like those of *Icterus*, or weaver birds, here artfully suspended for extra safety from such branches as overhung the more permanent pools.

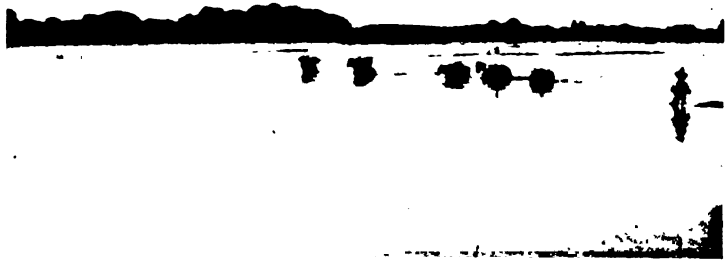
La Salina is a small settlement, at the head of an estuary, where salt-pans are worked, the crude salt being collected in large heaps under some shelter. There are many "salinas" along the coast, and these are connected by mule-tracks with the places further inland; in the present case with San Luis Allende, where we hoped to replenish our stocks. The inhabitants were mostly Zambos, rather friendly, and with nothing to do during the wet season. Although a pleasant guide was secured, it was not easy to learn anything reliable about the

distance to San Luis. These people did not know the meaning of leagues and hours, and the only information vouchsafed was that "If one leaves La Salina 'muy tempranito' ('Very little early'), one gets there after midday." Meanwhile the escort, ravenously hungry, commandeered eggs and tortillas, there being nothing else to be got, not even fruit, and after an hour's riding we came to the Chilcahuite, opposite

INUNDATED FOREST.

the large village of Marquelia. The river was broad, apparently in flood, and I never funked a crossing so much as this one, which looked so ugly, and proved quite harmless, the guide knowing the shallows well. It was a mistake not to stop at the village, at least near it, on a cerro, the scenery being exquisite, but the people were not hospitably inclined, and we managed to get on to the wrong side of the hill. I had inquired whether one could get up there to camp. "Como no?"—"Why not?" When we got to the foot the answer was

qualified by "If you take a party of men to clear a road." Somehow it was all mismanaged. We hoped for a suitable camping-ground a little further on, but there followed a long, terribly hot and stuffy ride along the left bank of the river, through low, scrubby growth, and several attempts to break through on to higher ground were futile. At last we came to an open space on a rise of granite, with tolerable water, good grazing, and beautiful views, mostly amongst the cheerless "raspa vieja" oak, though our front lawn was a carpet of blue



CROSSING THE RIVER CHILCAHUITE.

tradescantias and green, aromatic orchids. It was quite four hundred feet above the sea, which was visible across the sweltering forests and swamps, and, oh joy! the water in our buckets had by the morning cooled to 70° F. With sugar, and some of the spicy, wild lemons picked on the way, it was better than the most expensive iced, soft drink, and what a delightful sensation it was to our heated bodies to tub in "cold" water. During the night a "tigre" carried away a dog, making a terrific disturbance.

The well-trodden road led through hilly, partly open country, with thickets of mimosa and spiny, climbing plants, enlivened with "chachalacas." At some agricultural village

maize and tortillas were procured, and also a guide, who was soon dismissed, as the road seemed so very obvious. There was, in fact, too much road, since it presently divided, and we, with Sabino and Tranquilino, promptly took the right one, which was in reality the wrong one. At the fork the other path should, according to custom, have been closed by a freshly-cut branch being laid across it, as a sign for our pack-train not to take that path when following us. But Sabino was that morning in a sullen mood, and Tranquilino happening to talk about an "alco-ilis," wanted to know how that was produced. He meant "arco-iris," the pretty Spanish term for rainbow. The explanation was, I am afraid, not quite appreciated, and I further put my foot into it by saying that the origin of the term referred to Iris, a goddess who was supposed to walk across that pretty bridge. "There is no such goddess, at least, we have none," was his comment. The good Tranquilino was in his way a learned man, having read up the history of his country, being addicted to pondering over questions of political economy, and he considered he knew Italy rather well, because he had an Italian friend. That country was reached directly by steamers, and so was Londres, but the English lived on the other side of North America, which was somewhere opposite Vera Cruz, although their ships also called at Acapulco. The French were a race of soldiers in the pay of the Austrians, who were "ecclesiasticos," and had sent Maximilian to govern the country for the Pope. He lived in Italy, but the Italians had now a king of their own since they had beaten the French.

At a shady brook we paused for early lunch, that meal being usually the remains of last night's soup, with some chicken or game on feast days boiled down till it was soft As the pack-train did not come up Sabino went back, to return with the dismal news that two horses, or mules, were running about in the bush. So we went off on their track, and when we got the beasts at last, they proved not to be ours after all, and there was still no sign of the missing party. We waited long at that brook, employing our time with butterflies, lizards, and short dozes. According to a passing boy, San Luis was not

far in front. It took a good hour to get to the village, which was *a* San Luis, but, to our dismay, it proved to be a species called Acatlan, not Allende. This place was strikingly situated near a river, on hilly ground, amidst cocoanut palms and banana groves, and was *en fête* with fireworks, the beating of drums, and a procession of "gachupinos," not so well got up as those at Ayutla. The children were dressed gaudily in green

MARKET AT SAN LUIS ALLENDE.

cloth, with gold tinsel, and their arms were tightly bandaged with red and yellow kerchiefs. The 'comisario' was polite, and gave us a guide, but was otherwise in haste to go back to the dance, which we could not afford to witness. The poor guide was loth to serve us, as he was one of the "bailantes," and tried to escape every half-hour, and would have left us in the lurch had not Sabino, who by this time had become quite fierce, used means of persuasion.

There was a short, breakneck descent through a limestone

gorge, by far the worst place of all these crazy tracks, and it was not obvious how a pack-train could either get up or down those zigzag steps, either between, or formed by, those washed-out boulders. And yet for hundreds of years both men and beasts have carried heavy loads of salt over this very spot. San Luis Allende seemed to be one of those places which is always near and then recedes. But at last, after many turns, swamps, and tall weeds had been passed, it appeared on the other side of a grassy plain. The sun was just setting and a storm brewing when we selected a camping-place outside the village. With mixed feelings of relief we heard that the pack-train had been waiting at the market-place ever since 2 p.m., they having by chance taken the left, which was the proper road. The "comisario," or "presidente," was a very decent fellow, and had already given orders to clear out the school-house for our reception, and seemed quite put out at our intention of camping outside. It was better so, however, than inside a stuffy house in a noisy square. Of course, he promised every assistance, and so did the schoolmaster, not that anything came of it. All we wanted was food, and the place being full of resources, that night we revelled and feasted on bread, wine, coffee, sugar, and heavenly cigars.

In the morning we had a look round. Two rivers met near the village, high wooded hills rose towards the north, and in the distance, falling as it seemed from the very sky, rushed a big waterfall over a yellow limestone cliff, while all around us were meadows with cattle. Fortunately, it was Sunday, and, therefore, a fair, or market day, and there was a busy scene, the people coming from far and near to buy and sell their goods, and several different tribes being represented. The majority in the town are probably Misteca, with the usual admixture of those Spaniards whose ancestors had founded the place. There were also Musgos, and above all Tlapaneca, a small, interesting tribe still speaking their native idiom, who lived amongst the hills to the north of the town. These uncivilised natives, especially the women, were our delight, not on account of their rather ugly features, but because of their genuine dresses, each woman wearing her white cotton "huipil"

embroidered in red and blue with the figures of animals and plants. Of course, we coveted them all; and having settled upon a victim, pointed her out to Sabino, who, with admirable tact and persuasion enticed her into a house whence she emerged minus that garment, and clad only in her "enagua," or skirt. Sabino then mixed again with the crowd, giving us a wink, and pointing at his bulging shirt, which held the precious spoil. Besides the "huipiles," quaintly-shaped and gaudily-painted little clay whistles, mostly representing birds, attracted

EMBROIDERED "HUIPILES."—TLAPANECA TRIBE.

our attention; but otherwise it was a market for grain, many kinds of fruit, and meat. The people were very orderly, and most of them kept sober.

A woman died of dysentery overnight, and the burial ceremony took place close to our camp, which we had established unwittingly near the cemetery, for which it is the commendable custom of the country to select the driest spot available. The procession was headed by children carrying branches and flowers. Then came a boy carrying a cross in front of the black-painted, thin-looking coffin, which was carried on men's shoulders; next came the women, with more children,

screaming and weeping, and the rear was brought up by men and a band of music, in which the drum took a large part. They played a weird funeral dirge, which, with occasional pauses, continued in a monotonous but touching manner. After the ceremony, in which, by the way, according to law, no priest is allowed to appear, the friends returned to the house, where the same music was kept up till sunset. As to this exclusion of the priests, the whole Republic enjoys now, since the mischievous power of the Church was broken, at the time of the episode with the French and Maximilian, absolute freedom of creed. The Church is disestablished, and even the Church buildings belong to the State. Religion, the mode of worship, is rightly considered a private affair, and on no account can it ever again be used for political purposes. Hence, religious processions, or the display of ecclesiastic pomp outside the churches (within which full freedom, and the safety of the articles contained in the inventory, are guaranteed by the State), is absolutely forbidden. This is enforced so strictly that no priest may appear in public in his official vestments. On no State function whatever is even a prayer offered.

In San Luis the natives were, in a quiet way, devout enough; on Sunday both sexes crowded into the church, which an earthquake had deprived of the roof, and which had now been replaced by a safer thatch of palm-leaves and reeds.

Soon after the funeral several women approached carrying dishes with food; this was not, however, with the object of taking it to the departed, but it was our landlady, on whose ground we had camped, come to pay us a visit with her daughters, and to regale us with a dinner. They were invited to tea, which was new to them, and we became very friendly, so much so that the beauty of the party presented me with a "cocoyul" ring, made of some kind of jet, with inlaid figures. Claudio Garcia's acquaintance we had made already on the evening of our arrival, through his brother, the town clerk. To my joy he was suffering from heartburn, and some obstruction, complaints which I could safely tackle with the *materia medica* at my disposal. By the morning he was an altered man. "Friend," was his greeting, "you are a great one;

I have had such a night, and now, look, I have just finished and relished my breakfast, I who have not enjoyed food or drink for days. Sit down, please, and now we are going to breakfast together. I must do something for you in return, and my men shall catch ' coralillos ' and ' escorpiones.' " We struck a bargain, which, however, never came off, of a whole bottle of soda-mints against a single escorpion.

CLAUDIO GARCIA AND FAMILY, SAN LUIS ALLENDE.

The trade in animals was not so bad after all. Altogether the men and boys gradually brought in heaps of tortoises, clean-shelled *Cinosternum integrum*, beautiful tree-frogs, *Phyllomedusa dacnicolor*, enormous specimens of *Bufo marinus*, *Coronella micropholis*—which, painted almost exactly like the coral snake, with red, yellow, and black rings, lived in the houses, generally underneath the water-tubs—geckos, and so forth ; also a fine old specimen of the " zopilote rey,"or king

TLAPANECA VILLAGE.

vulture, and a tame "martica," or kinkajou (*Cercoleptes caudivolvulus*), was also for sale. Their offer to bring "axolotls" made me fairly jump. Surely these inhabitants of the "tierra fria" could not be found here; but they nevertheless described them as fat fish, with a thick head, four small feet, and a long tail, and they were—tadpoles. I might have guessed it, but how is one to know unless one learns by mere accident? Then and there it dawned upon me, and it was easily verified, that "axolotl" is the usual Aztec term for tadpole, which, near Mexico City, has been, not transferred, but rather restricted, to the famous larva of the *Amblystoma*—in fact "axolotl" is simply *the* tadpole, and there is not much need for speaking of ordinary "taddies."

The mountain with the waterfall, though looking within reach of a moderate walk, costs five and a half hours' steady riding, through the villages of Carmen, Las Baynillas, and Ayenjeble, leading to Santa Monica, a good hour to the south of which, near a place called Paso Pastoria, are hot springs, much resorted to by the natives, who wallow for hours in the pools between the rocks. When they are cured of their rheumatism and skin complaints, they plant a little cross, and if their numbers are a proof of efficacy the waters must indeed be effective. This district is already in Tlapaneca land; the quiet, pastoral folk, who walk about unarmed in their pretty valleys and mountain fastnesses, speak a language which is provisionally classed with Mixe. We were looking forward to see more of this scarcely-known tribe, and had intended to strike due north from San Luis and struggle across the high sierra to Quechultenango, and thence back to Chilpancingo. But, unfortunately, this plan had to be given up, for there was rank mutiny in our camp, the culprit being Pablo, between whom and his sergeant had grown up a feud. It was a most disagreeable and ticklish business to have to restore and to enforce discipline. Next, our men did not at all relish the idea of passing through the Tlapaneca country, with its unknown language, and the San Luis authorities thought it risky on account of the bad state of the tracks and scarcity of food for a large party. It so happened, moreover, that a

gentleman, a high Governmental official, a reviser of accounts, rode in with some rurales. He had come from the east, having been obliged to make a wide *détour*, and reported that the state of the track northwards had been rendered so bad by rains, that it was now out of the question to take a pack-

HEAVENLY CAMP.

train over it. All carrying of goods across the sierra had stopped. Well, there was an end of that plan, and there was nothing left but to move due west from San Luis, and to strike the old track somewhere south of Ayutla.

Whilst splashing through the river, we were waylaid by a man and woman, who had brought some interesting beadwork for sale, pieces such as are sewn on to the shoulders of their

"huipiles"; but it took some persuasion, in which the husband sided with us, to get the woman to strip herself then and there of the "huipil" which took our special fancy. The road then began to rise, and a number of little brooks, tributaries of the river on our left, had to be crossed, each new brook more fern-begrown, shady and pretty, than the last, and with clear, fresh water. There we beheld such a panorama that we could not resist camping there, although barely ten miles from San Luis. We called it the "Heavenly Camp," and it deserved its name. It was exactly 2,000 feet up, on a grassy, dry knoll under pine-trees, with a sprinkling of "nanche" and "encino amarillo," and at the back were the wooded ranges, one above the other, of the high sierra, while in front, seen through a natural vista in the pines, across many miles of sweltering, tropical forest, swamps, and lagoons, was the sea. Near the brook were ferns, begonias, and red dahlias, the latter drawn up by the oakwood shade to a height of seven feet. Once more, at this comparatively low altitude, there was nothing tropical about the aspect of the vegetation, which reminded us very much of that described between Limon and Pochote. We fairly revelled in the panorama and the fresh air, coupled with the absence of flies, and the presence of good water which did not need to be boiled and drunk lukewarm, so that men and beasts were able to work in harmony and peace.

On the next morning Miahuichan was passed through, a small and curiously scattered village situated in a bare spot, with many round houses instead of square ones. The inhabitants ran away, or hid themselves in the houses, and nothing would induce them to answer us. Only one man was caught, and he, poor fellow, knew but a few words of Spanish, and no Aztec either. By noon we came at last in sight of the river which we had expected from early morning, and about the difficulties of crossing which much had been said. On the opposite side, hidden by trees, the road having dropped again to 1,150 feet, is the village of Coacoyulichan. The river, which was of a good size, was fortunately not in flood, though full of boulders. The "comisario" was a reasonable man; without any fuss he sent us five men who, at twelve centavos, the usual

price, carried the baggage across, the animals being dragged, or swimming through, separately. We ourselves crossed by the bridge, a most beautiful work, which put the most scientifically constructed suspension-bridge to shame. It was a vine bridge, stretched between two enormous fig-trees across the foaming river. It was entirely made out of the rope-like stems and roots of vines, with four pairs of bottom strands, and two on either side by way of railings, and at the bottom, between the long strands, ribs of palm-leaf were interlaced with ample spaces between each, which presented anything but a reassuring appearance. The tree is ascended by a ladder,

RIVER NEAR COACOYULICHAN.

and before the middle is reached the whole thing becomes alive, undulating throughout the three dimensions. "Does this bridge ever break?" "Como no?" "How often is it renewed?" "'Quien sabe'; whenever it breaks; it has been pretty safe for a long time."

In the town hall were three wooden masks, painted red and black. Each was carved differently, and had its own special signification, as the people explained, though the one man who really knew was reluctant to give further particulars. They all were most friendly and well mannered, and on our enquiring what tribe they belonged to, the "comisario" smilingly said they were "too much mixed," although they were all "Indios

legitimos," *i.e.*, pure Indians. When Sabino told him that we had a chest with medicines enough to cure any mortal disease, he went into the town hall to send forth two men with wands of office. Then he said to me : " Chief, these men are to search the village, and if God will, they may bring you a case or two, although I doubt me whether there is any illness, as the time for the " calenturas " (the fevers) is still to come."

VINE BRIDGE NEAR COACOYULICHAN.

We had barely left this hospitable village, in the early afternoon, when a sudden rain drenched us, and it was with difficulty that a camping spot was found, the terrain being so very uneven and covered with vegetation. It was a nuisance, and spoiled our further trading, although some men brought various creatures, and a curious old dancing dress of yellow-dyed leather, with animals and plants embroidered on it, and bedecked with a border of silver braid. This dress had been used by their master of ceremonies ; they parted with it on

the understanding that we should not show it to any of the authorities or to a priest. They brought it only for show, but we pleaded earnestly, and told them that I had not got a single dancing dress, and that I should be proud to wear it when occasion arose, whilst our escort bore witness, and promised that we should not betray them. To our surprise the man took it seriously. He made me put it on, and was careful to explain how the parts over the shoulders, which were badly broken, could be mended. Now, all this happened just because we tried to enter into their line of thought; we took it, for instance, as if it were valuable news that a dance in such a dress and with such masks would bring rain when performed at the proper time. Yes, we also had prayers for rain; now and then our high priest ordered them to be said all over the country. "Ah, our padre won't do that; he does not allow us to hold a rain ceremony in the Church; he says he does it all himself. But, say, what results does your chief rain-maker get?" "Well, he considers it frivolous to hold these rain-meetings unless there has been a very long drought, unless, in fact, the rain has been long overdue." "The same with us."

The screeching red macaws heralded a beautiful morning, and then came two women visitors, one with a bad throat, the other with a large fowl under her arm, as the intended fee (the cock of Æsculapius!), and her astonishment was great when we paid the regulation price of 2½d., provided her friend with material for a gargle, and made her go through the unaccustomed performance.

Travelling became troublesome on account of the bad state of the trail, and the incessant crossing of rivers, troubles which increased the higher we ascended. Then we managed to lose the track altogether, and our pack-train returned and reported further progress to be hopeless. At a place consisting of three houses, fitly called Rancho Escondido, or "the hidden farm," an old man was willing to act as guide, and after a long *détour* we found ourselves again at the low level of 500 feet, amongst "cocoyul" palms, and a kind of dwarf palm, only eight feet high, with nasty prickly stems, there being all around us swamps and stony ground covered with a dense mass of salvias and

LEATHER DANCING DRESS AND WOODEN MASKS FROM COACOYULICHAN.—TWO MULES, MADE OF RUSHES, CARRYING SWEETS AND FLOWERS, PRESENTED TO CHILDREN ON ST. JOHN'S DAY, MEXICO CITY.

sunflowers. How we had learned to loathe this "yerba." The weeds either sting like nettles, or else they scratch, or are covered with a glabrous, rosin-like substance, whilst, above all, they exhale a sickly, pungent smell which hovers in the moist, dank atmosphere. It is bad in the daytime when the heat of the sun causes the oils to evaporate, worse in the evening when the plants exhale it on their own account, worst of all, suffocating at night, after a rain, when the rising steam is laden with the smell of the rotten humus. Frequently this stuff reaches above the rider's head, there is no break in it, and it is the despair of the collector or observer of life, since he cannot pick up anything in the tangle. When snakes, lizards, birds, or insects are seen, it is just a glimpse, and they are gone. All this tangle of weeds and creepers disappears during the dry season, and then for months the ground may be almost bare. The heat dries and burns up the stalks till they are perfectly brittle, winds beat them down and scatter them, and with the first onslaught of the rainy season enormous masses of this rubbish, haulms and sticks, are washed into the roaring torrents which spring up as if by magic, and are then fairly choked with the herbaceous *débris*. Every new spate carries down more, and when the slopes have at last been cleared, there is still enough comminuted stuff to give the rivers a chocolate-brown colour. All this is as it should be, and one also understands the reason for the deep accumulations of rotting stuff in sheltered places, which become hot-beds for other plants, but it is somewhat of a puzzle to know how so much of the dried-up growth can disappear long before the rains set in, unless it is eaten by the millions of ubiquitous ants and termites.

From the village of Asesucar our guide took us to the neighbourhood of Meson Viejo, which is, as its name shows, a place where the natives are obliged to give shelter and food to man and beast. The country was a little more open, and we found a dry spot on the granitic soil amongst mimosas, nanche, raspa vieja, *Cassia*, and ceiba trees, with arums, and arboreal *Cereus* near the brook. The view was grand, and a striking effect was produced by the many large clumps of *Loranthus* in the trees, now in full bloom. In the sierra, to the

north, it had been thundering since the early afternoon; a black thunderstorm burst after sunset, and for the next few hours lasted as a soft and thick warm rain. The lowest night temperature was 69.5° F., and the altitude about 800 feet.

On the following day we struck the Ayutla trail, went right through the town, and camped an hour to the north of it; then I rode back with Tranquilino to forage, and to buy shoes for the horses, most of which had lost a shoe or two, Sabino, who was a skilled farrier, having long ago exhausted his spare stock. We made a regular raid upon the bread-shop, and then fairly feasted on what we obtained. Only a native can keep well on the everlasting, insipid tortillas, which are either flabby or burnt and blistered with a liberal seasoning of charcoal and the ashes of the camp fire. Unfortunately, bread soon deteriorates in the tropics; it gets mouldy, or becomes so dry and hard that it loses all the advantages of leavened bread, and it was impossible to carry enough for more than a day. When these Indians had much, they consumed much, eating half the night through, and on the next morning they had nothing, trusting either to luck or to our stores. They could never be prevailed upon to carry a supply for themselves, nor for the horses, it was not "costumbre," and since we often camped at unexpected spots where nothing could be procured, they squatted on their haunches like turkey buzzards, eyeing every morsel that we ate ourselves. Now, you cannot enjoy your own food, scanty as it may be, under such conditions. Once or twice we did try to starve them into submission, by way of teaching them a lesson, having warned them previously that, if they passed through a likely village without catering for themselves, they should have nothing, but in the long run it was we who suffered. When Pablo shot a "conejo," he roasted it himself on his own fire, and picked the bones clean, apart from the rest of the company, like a hawk which turns its back to its companions, screening its prey with its own wings.

There was other trouble in the camp. Excepting my wife's and my own horse, after which we had looked ourselves, being careful to see that an extra sweater was put under the saddle, every other beast had a sore back. The horses each had a big

TLAPANECA AND ZAMBO CHILDREN.

boil on the crupper where, owing to the incessant ups and downs of the road, the saddle bumped upon its spine. That, they said, did not matter, since it always happened. The backs of the pack-animals were in a sorry condition. Now, in Chilpancingo I had bought packing-pads for each of them, soft mats an inch and a half thick, made of felted cocoanut fibre, such as are used by every muleteer. These mats, however, were never put on; Rafael had stowed them away in a bundle, using his own dilapidated rubbish, which consisted of little but holes held together by packing thread, and a mere fringe of matting; his intention was, of course, to bring our mats back entire and then to sell them again. The big mule was in the worst plight. These creatures, though not the horses apparently, and certainly not the donkeys, are liable to mysterious swellings proceeding from the shoulders and spreading either towards the flanks, or—and this is considered more dangerous —forwards over the chest and neck. The inflamed portion swells up, becoming at first hard, but then fluctuating, whilst the creature itself is feverish, refuses to eat, and is likely to die. After being severely rebuked about the mats, Rafael was sent back to the town to buy some of the remedies that are fancied by muleteers; needless to say he spent the money on himself. That night there was much horse-doctoring. Pablo was made to apply fomentations to the mule, and when Rafael returned he was put on to this job, which, being a new, although, as it turned out, a most effective remedy—was not to their liking. This treatment of the sore backs caused much kicking and biting; but the kinosol lotion was most beneficial, and henceforth every one of the rurales kept a bottle of it. Why, it may well be asked, was not all this seen to weeks ago? First, because the men never used the lint, ointments, or lotions they were given until now, when things had reached a climax; next, because the "arriero" had sole charge of his string of beasts, and it was not my business to interfere with the horses of the rurales, which belonged to the Government, and were not private property, like our own riding-horses. Lastly, which is the chief reason, in addition to mere callous laziness, there is the custom of never washing the animals' backs.

It is believed that a sweating animal catches cold if its saddle, or " apparejo," be removed before it is dry ; and to put a cloth over its back is not customary ; hence, instead of this, the poor beasts are allowed to stand about for hours in their soaked, over-heated, foul trappings, which cannot dry beneath the pack, and it is not till this is at last taken off that the " arriero " with a special spatula scrapes off the scurf produced by the festering sores from the pads, throws a handful of dust upon the sores themselves, and leaves the creatures to the mercy of the flies. The animals are never hobbled or tethered. If they are hobbled, it is said that the " tigre " will eat them in the " tierra caliente," or the " leon," in the mountains ; if they are tethered, they cannot find enough grass, or, as indeed does invariably happen, get hopelessly mixed up in the bush. If anyone interferes, the blame is his for the slightest thing that goes wrong. Therefore the beasts are allowed to wander about, cause disturbances in the night by tumbling over the tent-ropes, or stray at will. On the following morning they had all run away, except the sick mule, and we had a long hunt for them. When one was caught it had to be taken to the camp, saddled, and then off again until the others were at last brought in. Then a letter was despatched to the " jefe politico," a new man, who was ill in bed with fever, for the levy of three fresh animals. Such were the aggravating delays that occurred here.

The man in charge of the new beasts was a " Pinto," one of those unfortunates who suffer from the " mal del pinto," a mysterious disease, common in the " hot-lands " of Mexico and Central America. It begins with the deposition of small patches of black pigment, on any part of the body ; these patches spread, and become blue ; in later stages the normal brown pigment disappears, and part of the black also disappears, changing to red, and ultimately to sickly white patches, which give the person a disgusting appearance. There is, however, no suffering and no malaise. This disease is not infectious, and apparently not inherited. It is restricted to Central and South America. In Mexico it is confined to the Pacific slope from about Mazatlan to the Isthmus, and, as a rule, it does not

go further inland than a few days' journey, which happens to coincide with the average distance to which dried fish are carried, a diet much affected by the poor. Pintos at Chilpancingo, Oaxaca, or Zapotlan, are invariably not natives of these places. The disease is essentially one of the costaleños, but also creeping up the Balsas basin, and thus it has come to pass that it is usually connected with fish diet. In South America it is most common far inland, on the Andes range. Some suppose it to be due to a too one-sided diet of Indian corn, this being devoid of a certain substance necessary for man's well-being. But in many large districts of Mexico, for instance, on the plateau, people live on scarcely anything else but tortillas, and yet the " mal del pintos " is unknown. Probably some fungoid growth upon the maize will be discovered, as it grows only under certain conditions, hitherto unknown ; just as bad rice is responsible for the dangerous beri-beri of the East.

The native doctor or, rather, apothecary, may be found on market days squatting among the throng of other vendors before a mat, on which is displayed his stock, but he is easily passed over, since his goods look so insignificant. When treated sympathetically he will open out and impart much startling information. Some of his medicines work upon the principle of homœopathy, and these are mostly charms, others are allopathic, and contain some real medicinal agent. With some the reasoning seems obvious, with others far-fetched, or so involved that it is lost in transcendental theosophy now but vaguely remembered. There is, for instance, the root of the " yerba immortal," small pieces of which are taken as a purgative ; an infusion of the red bark of the " mulato " tree is good for the chest ; the root of the " yesgo," taken similarly, alleviates rheumatism. None of these can do much harm ; but the " noz vomica," which is sold at one real each, and is sometimes nothing but a walnut, has to be taken in small doses, little scrapings of this very poisonous kernel being taken in cases of pneumonia and pleurisy. A decoction of the apple-like fruit of the *Crescentia*, which contains some very potent drug, is much favoured in cases of cough and " weak chest." The

whooping-cough of children, however, is treated with a pounded-up piece of the shell of the armadillo, taken internally, whilst the shed skin of a snake cures "el gálico," or ulceration of the chest. The philosophy of the latter nostrum is not so far-fetched as may at first be thought. In many parts of Southern Mexico people suffer from a mysterious disease which, when fully developed, shows soft and discoloured, though not inflamed, patches on the skin, often on the chest; these spots become quite soft, and beneath the skin may be a large cavity extending right down to the bone. There is much watery discharge, with much sloughing and peeling. Here comes in the snake, at the best an uncanny creature, with its periodically sloughing and renewed skin. "Palomitas," literally butterflies, but in this case the large, thin-winged seeds of some bignonia, sold in the pod, cure headache, if one of the seeds be glued on to the patient's head; in chronic cases a little packet of seeds is sewn up and tied on, to be worn as a more or less permanent charm. Another cure for headache is the dried head of a woodpecker, because this bird, using its head as a hammer, must be free from headache, and therefore may impart some of its enviable immunity. A little bit of the skin of a coyote, or jackal, with the hair on, may ward off the effects of a chill, if the patient burns and inhales it over a charcoal fire. The slimy skin of the axolotl, stewed to a jelly, alleviates asthma.

The above samples do not exhaust the list, which is really endless; almost any odd-looking seed, as, for instance, the "ojo del venado," or stag's eye—*i.e.*, the seed of the *Mucuna urens*—the rattle of a snake, a tooth, the finger of a corpse, a dried humming-bird, or anything equally strange, may somewhere or other be considered a potent remedy or charm.

It is possible that the old Aztecs had some serviceable knowledge of the medicinal properties of their plants.* If that was so, their descendants have lost most of it. I have often found, to my disgust, that they no longer know the names

* *Cf.* the works on the Natural History of Mexico, by F. Hernandez, translated, edited, etc., by F. Ximenez, Mexico, 1615, with the title: "Cuatro libros de la naturaleza y virtudes medicinales de las plantas y animales de la Nueva España." Reprinted, Morelia, 1888.

of their plants and trees; the names mentioned by one man were at once contradicted by another, and they further differed in neighbouring districts, although the people belonged to the same stock. This is due partly to the spreading of the Spanish language; and partly to the influence of the priests, who discourage anything like ancient folk-lore. Instead of trying to study the properties of the concoctions prepared by the natives, they persuade them to rely more upon the miraculous powers of a little oil, which the native buys in the shop and then takes to the priest for his blessing.

In entire countries, sometimes in large provinces, medical men are not available, and no travelling doctor could make a living at the low prices ruling. It would be a boon to such States if their Government could see its way to establishing a kind of primitive dispensary in the chief municipal centres. There being no medical advice, the medicines should be restricted to such as cannot do much harm, even if occasional overdoses are given. The stock need not consist of much more than quinine, purgatives, or bismuth, for cases of dysentery, chlorate of potash for gargling, bi-carbonate of potash, or kinosol, for making antiseptic lotions for wounds and sores, carbolic acid for the sand-flea, etc.

This may sound rather unprofessional, but it must be remembered that the natives actually do buy, on their own responsibility, all kinds of drugs in the "boticas," or chemists' shops of the more important towns. Moreover, various medicines can be bought in many "tiendas," or shops, on the plantations, though the prices charged are shamefully high, and the stuff sold is often so stale, or adulterated, or of such a quack character, that it is useless. The difference between a good doctor and none at all may sometimes be small, whilst an amateur can do much harm, but, as a matter of fact, the sick Indian without them will continue to suffer, or will die with a fair certainty, and since his friends try to cure him, he may as well, in any case, be given the chance of the right drug. An annual expenditure of one hundred pesos, spread over a whole State, need not kill a single person, whilst it is sure to alleviate the sufferings of thousands. The doctors could not well

complain where scarcely any exist, and more than that small sum is embezzled in every town.

The commonest diseases in the Mexican "hot-lands" are various forms of malaria, mostly the "paludismo," "calentura," or ague, whilst pernicious kinds are much rarer. The Indians suffer as much and as repeatedly as those of white extraction. Some persons, even children, are quite immune, in a large family of which all the other members suffer every year. On the Atlantic States, with their much wetter climate, the malarial season sets in with that of the heavy summer rains; on the Pacific side, at least in Guerrero, the time for the dangerous kinds is the dry, or winter, season, and a short period of recrudescence coincides with the setting in of the torrential rains in May or June, but the rainy season itself, from June to September, is considered far less dangerous. It often happens that a native, who may appear practically free from malaria, or only subject to slight attacks, breaks down seriously when going on to the healthy plateau, the unavoidable chills being sufficient to bring on the outbreak. Chills are responsible for most illnesses in the tropics. It is so very easy to get chilled in the "hot-lands." A slight wind makes the perspiring skin feel icy cold, although its surface temperature may be as high as 80° or 82° F., because the cooling effect of the rapid evaporation is so great. The natives, in their draughty reed huts, and dressed in cotton, are pictures of abject misery when a cold rain is keeping everything in a clammy state; and rheumatism, sore throats, fevers, and dysentery are then rife. A pedlar might make his fortune by selling soda mints, where heartburn is such a common complaint. By the way, when a man is bilious, he is said to have "un viento en el higado," "a wind in his liver."

There is not much to tell about the return journey to Chilpancingo, with our large "cavalgadura," now swelled to seven or eight people, and more than thirteen beasts, and all the more difficult to feed and keep in order. The look of the open country had changed; yellow, orange and blue composites had covered the ground, and "yerba" had grown up, the force of the rainy season having spent itself. It was

hereabouts that we were joined by a wild-looking traveller from some unknown tribe. His dress consisted of nothing but a zarape with a slit for the head, a sombrero, an amulet round his neck, and a machete. Through him we first heard of the "guerra" which had been waged by the Government near La Cruz Grande against those bandits.

Theoretically, we had planned a halting stage well beyond

MIXE WITH AMULET.

Tierra Colorada, but Fate decreed that we should stop in its neighbourhood, everything going contrariwise. Much of the baggage had got soaked on the Cumbre del Coquillo, and required overhauling; Tranquilino, our quiet mainstay, collapsed with an attack of fever at Omitlan, which was no place to camp in, nor was there any such near it. I bungled over a stag, and Sabino, sent into the village to forage, came back late in the night with an offering of a box of matches instead of the expected eggs and fowls—drunk! It rained steadily, the

" yerba " smelt worse than ever, all the old insect pests asserted themselves, and there was the man in the luggage tent who had to be helped through his paroxysm, and to be coaxed into a sweat. This good fellow, whom we liked best, hampered our

LOOKING SOUTH FROM LOS CAJONES RIDGE.

progress considerably, and had to be kept out of the daily soaking. Our next camp was, therefore, made near Rincon, at the south foot of Los Cajones, in splendid air, and on rising ground, just in time to get him under shelter before a magnificent storm burst, which then clung on to the high ridge,

producing a most gloriously tinted sunset. I don't know what possessed us, maybe it was the change of temperature, which, during the day had been like that of an oven, and had cooled by 8 p.m. to 66°F., or perhaps it was the sunset and the aromatic exhalation of the pines, in place of the stench of the "yerba," but, anyhow, we decided to move on to the top of the Cajones and spend the next day there. Accordingly, the tent was pitched as near the top of the pass as possible, and my wife attempted to sketch its most beautiful views, with its ten distances, and the whole day was turned into a joyful picnic. Sabino retrieved his character by catching a *Philodryas putnami*, a rare snake, hitherto known only from a few localities in far-off Jalisco. The incessant soaking, and perhaps also the wading about in the lowland swamps, had not, in the hot country, caused me much inconvenience, but here on the higher ground, and with the tolerable night temperature, combined with the crisp air, rheumatic stiffness asserted itself. I had been shooting on the Cajones road and, whilst stooping, got doubled up with a twinge of lumbago, and was leaning against a rock, with my head resting upon my arm, when down rushed Sabino, attracted by the shots, throwing his arms round me and enquiring where and by whom I had been wounded. This little bother soon passed off, only for the next few days it made the incessant climbing in and out of the saddle disagreeable ; it disappeared again in the hot valley of the Balsas, not to recur. The night was painful, but we were diverted from bodily troubles by other lively conditions. With some misgivings we had discovered that not a few trees on that ridge had been split by lightning, and took at least the precaution of actually moving the camp away from underneath some of them. The storm did come, rather late, and then two more storms came from different directions, and soon we were in a most tremendous uproar of the elements, the storms making right for the ridge, and keeping at it till after midnight. One or two of the reports were deafening, and it was as if the shocks could be felt coming out of the ground into our camp beds. There was nothing for us to do but to lie still, and to promise not to do it again.

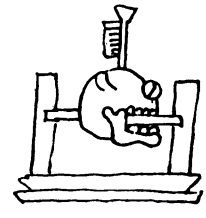
Nobody is afraid of being struck by lightning in South Mexico, whether in the open or in the forest, the natives taking shelter under a tree without hesitation, and I did not hear of any accidents, nor did we ever see a flash strike into the tropical forest. Possibly the heavy rain wets the trees so thoroughly, or they themselves contain so much moisture, that they act like so many lightning conductors. It is well-known that here, in Europe, certain kinds of trees are practically immune, as, for instance, birches and beeches, whilst pines are particularly dangerous, those pines which stand in certain positions especially so. It may be because these trees prefer rather dry soil, and have no taproot, while their wood is especially rich in rosin. The pines on the Cajones were in as dangerous a position as they well could be, but perhaps familiarity breeds contempt in a country where electric explosions are witnessed every day for months.

When we rode into Chilpancingo, alighting at the Hotel del Sur, the landlady did not at first recognise us; we had become so weather-beaten, brown, and thin. The hastily-planned fortnight's trip had grown to five complete weeks to a day, with twenty-four camps, constituting a round of some 510 kilometres or 316 miles, according to my subsequent calculations and map-making, not counting departures from the track. This is not much of a result for twenty-six travelling days, giving an average of only twelve miles a day; but the quality of the road accounted for this, and, after all, the journey was one of exploration. It would have been better if the time could have been spread over a shorter distance, to allow for a more than hasty examination of those spots which proved especially attractive.

There was much to be settled in the town, above all, the accounts of our prolonged trip, and as the Governor was away, in Mexico, I saw more of the Prefect than was good for either of us. Thanks to his keeping of the accounts, and his badly-earned wages as *valet de chambre*, Sabino was now in affluent circumstances, eager to continue the journey to Iguala with two inexperienced straplings instead of Pablo, who was seriously thinking of leaving the service, and of Tranquilino, who was

put on the sick list. The worry, the threats, the loss of temper about procuring new animals were repeated, to a worse degree than ever, although the owners of our riding-horses had expressed themselves as completely satisfied on seeing the sleek, well-fed, and frisky condition of the horses (which were without sore or boil), and they promised to let us have them again. By the time that they were wanted, however, they could nowhere be found.

Near Zumpango, in the almost dry river-bed, we were overtaken by a storm, which came up so suddenly that there was scarcely time to climb the loamy bank, take the loads off the animals, and begin to unfold the tent before the place was an inch under water. With the hope of studying animal life in the Cañada, we pitched camp in it again next day, but with disappointing results. At the upper end, near Mesquititlan, we had, on our outward journey, found some *Sceloporus* climbing about on the rocky walls of the gorge; these having proved a new kind (*S. gadowi*), we were anxious to get more, but the sky was cloudy, and no more could be found, another instance of how fortuitous and accidental such discoveries are. Besides *Cnemidophorus deppei* running about in the grass at the bottom, and iguanas climbing on the rocks, no life was visible, except butterflies and other insects. The entire pass is a gorge with very steep walls, and the bottom, even where it widens out into grassy valleys, is subject to sudden spates. Still this scarcity of life was surprising, for there were no "tejon," no "cacomistle," no kinkajou, or any similar beasts which elsewhere enlivened similar places, not even "zopilotes," after which the Cañada is named. Yet nearly every day, or district, brought something of interest which set us musing, and I know of nothing more cheering and helpful in getting one over the ground, whilst jogging along at the normal rate of 3¼ miles an hour, than fitting together little bits of observation to make a problem.



HIEROGLYPH—ZUMPANGO.
"*Tzom-pan-co.*"
"At the place of many skull trophies."
Pantli = standard, sign for 20.

Many a hypothesis was launched and developed into a theory, beautiful but short-lived, like the white flowers of the climbing *Cereus*, to wither when exposed to the full light of day.

Here, near La Venta Vieja, where the valley broadens out, a tributary from Xochipala joins the main stream, having formed high banks by eating into the loamy and gravelly ground. This was a breeding-place of motmots, which, like our kingfishers, dig deep, horizontal nesting-holes into banks of this kind. Near by was a " cuadrilla " of a few reed huts, which belonged to a carpenter whose family were bird-lovers. They had a dear little parrakeet which climbed about in the hut, and

VENTA VIEJA.

at night slept in a gourd, and one of the women was stuffing some young motmots with " massa," the paste from which the tortillas are made. Motmots are a typically tropical American group of birds, related to kingfishers and bee-eaters ; southwards they range through Brazil, northwards through the hot and temperate parts of Mexico, and, curiously enough, one species extends on to the plateau itself, to the Valley of Mexico. They are generally described as inhabiting dense forests, seldom visiting the outskirts, and preferring the vicinity of streams. We had been puzzled by the fact that we had seen none in the really dense forests of the lowlands, and in eastern Oaxaca, only in the neighbourhood of swift rivers, for instance, at Tetela and La Raya, while here again in the Cañada there was

more bush than forest. The reason of this scattered distribution is that they depend upon rivers or streams which have sandy or loamy banks, but not swampy, nor rocky, nor covered by vegetation. The motmots are omnivorous, their serrated bill indicates the fruit-eater, and they are fond of berries, as well as of insects and small lizards. They live either solitary or in pairs, flitting before the traveller from tree to tree, or sitting on the lower branches, whence they make sudden dashes to secure their prey. They are very beautiful without being brilliant, green and blue predominating in their plumage; consequently they breed in cavities, and the sexes are alike; or it may be that, both sexes being alike and vividly coloured, they therefore conceal their nest in a cavity, as is the case with kingfishers, bee-eaters, and rollers. Which is the correct view?

The motmots provide an almost uncanny puzzle. The middle pair of tail feathers is much longer than the rest, and the vanes of this pair are for some distance somewhat narrowed, broadening out again towards the tips, so that the feathers are slightly racket-shaped. In young birds this tapering, or constriction, is slight, but increases with successive moults. Before the feathers have, however, grown to their complete length, the bird deliberately nibbles off portions of the right and left vane, or web, to an extent which varies from one to four inches, according to the species. They take their time over it, the gaps left by each species respectively, being met with in any stage, and often asymmetrical, until the process is finished, when the brightly-coloured terminal racket is left connected with the rest of the feather only by the very thin shaft. Further, these birds are in the habit of deliberately flicking their tail sideways, to right and left, like a pendulum,* so that the two rackets seem to flit about like a blue or green butterfly. At any rate, it is the fashion with these birds to have such tails, and since they cannot grow the rackets by nature, they cut them out artificially. Possibly the slight constriction above mentioned was the first thing that suggested this mental freak. It is the only instance positively known

* A good photograph is given by C. Beebe, in his delightful "Two Bird Lovers in Mexico."

1. 2. 3. 4. 5. 6. 7.

Figs. 1 to 4.—Successive stages of the pair of Central Tail-feathers of a Motmot, as cut by the Bird.
Fig. 5.—The Tail as cut by *Momotus*.
Fig. 6.—The Tail as cut by the Celebes Parrot (*Prioniturus*).
Fig. 7.—The Tail of the Moluccan Kingfisher (*Tanysiptera*), showing natural racket-shaped growth of feathers.

of normally-minded birds methodically destroying part of their precious plumage, except the parrot (*Prioniturus platurus*) of Celebes, which does exactly the same.

Over-zealous Lamarckists may possibly still look upon the fact that these feathers gradually approach the narrow-vaned shape, as an instance of the inheritance of acquired characters, on the assumption that the repeated process of nibbling the feather into such a shape has ultimately caused them to grow into it. But it is not necessary to resort to such a phantasy, and thus to put the cart before the horse. On the contrary, it is a way which many over-elongated feathers have, to grow slightly narrower webs at that portion which, so to speak, is intercalated by overgrowth. That is quite intelligible as being in the nature of feathers. Cumulative inheritance along the line once started upon, will then do the rest, until eventually a perfect racket will result without any interference, or help, from the bird.*

White butterflies, with dark " eyes " on the wings, measuring four inches across, were abundant, and apparently liked our cavalcade, as they clearly overtook it and flapped along in front in leisurely fashion, or hovered above it, at once to rise out of our reach when pursued, and to play about again a little further on. We had seen many of them in the month of June near Cuernavaca ; here in the Balsas valley, in the middle of August, they were just emerging ; especially during the forenoon they could be observed sitting on low branches, with their wings still crumpled up and limp, and before the wings had dried sufficiently they fluttered together and paired. Enormous transparent *Neuroptera*, with formidable mouth-pincers, made for the butterflies, and in the same valley, on shaded trees, were curious snails two inches long, quite white, and therefore very conspicuous, some, especially the biggest, with a large extra spiral ridge parallel to the opening.

The river of the Cañada was low, fortunately, as for the

* Other instances of elongated tail-feathers, more or less spatulate, are common, *e.g.*, the central pair of the Malayan Kingfisher (*Tanysiptera*), the African sunbird (*Nectarinia famosa*), and the Indian fly-catcher (*Tchitrea*). In some humming birds (*Lesbia*) it is the outer pair that are long and spatulate.

CAMP NEAR MESCALA.

greater part its bed formed the road, which was completely overhung in many parts by the meeting branches of the dense vegetation. It would be no exaggeration to say that we crossed and recrossed it a hundred times. The camp close to the Balsas river, this time a little higher up, and on the northern side, was extremely picturesque, but spoilt by the usual pest of insects. The escort had carefully pitched the tent

A HOT RIDE.

as near as possible to a colony of ants, which lived in the honey-combed ground, and soon sent out their soldiers in distressing numbers. There was nothing left but to make a cordon of burning logs, which added smoke and heat to the already more than sufficient sultriness. The removal of the whole camp was seriously contemplated, when the situation was saved by the strewn feathers of a plucked fowl. Every one of the feathers was got hold of by some ant, and it was a comical sight to see how these feathers danced about in an upright position, and,

as if by some effort of their own, disappeared in the ground. Within half an hour none were left, and there was peace, at least from the ants. The big river had fallen much, at least eight feet, leaving the banks covered with a thick, chocolate-brown ooze.

The return to Iguala was uneventful.

TORTILLAS.

It was a terribly hot ride until we reached Iguala, and camped actually in the railway station, to be prepared for any emergencies, in anticipation of the vagaries of the train, which, in the early morning, should carry us to Cuernavaca. Close by was a Chinese shanty, and there were iced drinks, tea, and rolls, and then a belated lunch (or was it early dinner ?), and then a never-before-so-much-enjoyed meat tea, and when the evening train came in, and supper was made ready for possible passengers, we once more rose to the occasion.

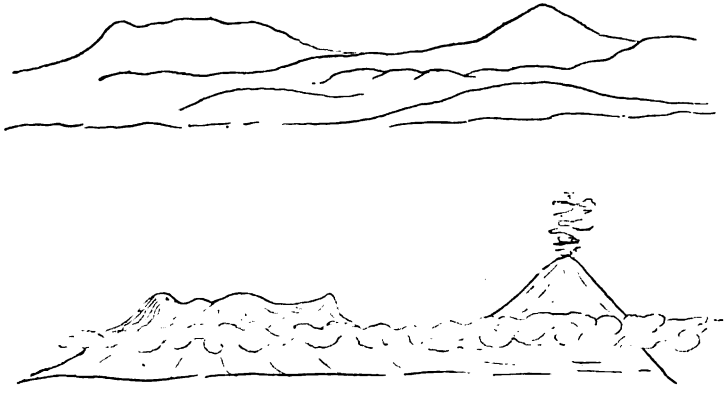
CHAPTER XXIII.

AN ASCENT OF POPOCATEPETL.

Features of Popocatepetl and Iztaccihuatl—Altitudinal Distribution of Plants—A Night spent at 13,000 feet elevation—The Ascent to the Crater and the Descent—Perilous Ride back to Amecameca.

There are certain names firmly associated with each other, and stamped indelibly upon a child's memory from its earliest lessons in geography. The bare mention of the word Mexico is sure to conjure up in many minds the odd-sounding name Popocatepetl, usually pronounced with some hesitation, and yet easy enough if one knows how to manage it: "popóca"—"to smoke," "tépetl"—"the mountain"—the "smoking mountain," and "Iztaccihuatl"—the "White Woman," with their summits reaching high up into the azure sky, and capped with eternal snow and ice, are in full view from the plateau of Anahuac, in the centre of which stands the City of Mexico. Thus speak the guide-books, but they should add the important clause "when they are visible." It so happened that in the summer and autumn of 1902 we spent, off and on, several weeks in or near the city without ever catching so much as a glimpse of that pair of giants. It was on the last evening before our leaving that land of wonders, when returning from a walk over the lava-field to the south-west of the capital, that we beheld the famous panorama in all its glory. The September evening was refreshingly cool at that altitude of 8,000 feet, the air still, and had been cleared of every particle of dust by the afternoon's rain, so that the sunset tints were at their best. Our standpoint was the "pedregal," the petrified

billows of rough lava that had flowed forth so recently from the Sierra de Ajusco that they buried corpses and implements of some representatives of prehistoric mankind. In the plain below stretched the great city, with that dreary sheet of water, Lake Texcoco, beyond it, and Lake Xochimilco, to the right, in a land of flowers and green pastures. But the setting of the scene baffles any attempt at adequate description. Some twenty miles away to the right, beyond Xochimilco, stood out against the purple sky that old giant, Popocatepetl, raising his head up to a height of nearly 18,000 feet, that is



REALITY AND FANCY.

Upper figure—The two extinct volcanoes, Iztaccihuatl and Popocatepetl, as seen from Mexico City.
Lower figure—The White Woman and her funeral pyre.

to say, 10,000 feet above our standpoint, with a broad cone of colossal proportions, the last 4,000 feet of which were clad in snow, bathed in the rosy reflections of the sun, which had already set for us. To the left of Popocatepetl, just in the middle of the panorama, lies his companion Iztaccihuatl, well-named "the White Woman," because, especially from this point of vantage, its outlines bear a certain resemblance, not at all far-fetched, to the figure of a woman in a shroud. Her head points to the north, while the neck, bosom, knees, and feet, are formed by the striking outline of this long-drawn-out volcanic ridge. Less romantic, but equally to the point,

is the Spanish name of this mountain, "La mujer gorda." Black-blue crests and precipitous gorges interrupt the snow, indicating the dangerousness of this sleeping beauty, which few men have succeeded in conquering, while some have paid for the attempt with their lives.

Scarcely two years later we beheld the giant again, this time from Cortez' palace, in Cuernavaca, when day after day it loomed up in brilliant sunshine, its immense proportions enhanced by its being seen from a level of but 5,000 feet above that of the sea. Then and there we vowed not to leave the country without having seen it from its very top. It so happened that we made the ascent just after our return from the tropics of Guerrero, somewhat exhausted and very thin, but perhaps for the latter reason all the more fit for the climb.

IZTACCIHUATL AND POPOCATEPETL AS SEEN FROM CUERNAVACA.

The few necessary preparations were easily made. One of the higher officials of the Inter-Oceanic Railway obligingly telegraphed a short order to their agent at Amecameca, and that was all that was necessary. It is in the interest of this railway to promote tourist traffic; they are on friendly terms with General Ochoa, who owns a large slice of the mountain, though no less than seventeen people are said to claim part of it, always including the top. We left San Lazaro Station on the 7th of September, at 8.10 a.m., and arrived at Amecameca at 10.28. The road leads through the flat land between Lakes Texcoco and Chalco. The heavy rains had transformed the country into a huge swamp, and Lake Texcoco in particular had actually no limits, since water, rushes, and weeds intermingled here and there with stretches of sand, combined with the hot sun in producing wonderful mirages. Cattle and horses which, during the dry season eke out a precarious existence

on the scanty pasture, stood in the water up to their bellies, and browsed off the luxuriant plants. Sunburnt natives, in white cotton trousers, and with large sombreros, waded about, driving some of the numerous waterfowl, snipe, plovers, sandpipers, and ducks into primitive nets, artfully concealed amongst the rushes ; or a man suddenly rose out of a clump of reeds with a big racket-like net set upon a long pole, and made a dash with this contrivance at a swarm of birds that whirred past him.

Amecameca offers no attractions, least of all the Hotel Hispano y Americano, where it is as well to keep one's eyes open. Nevertheless, " pero no hay remedio "—that " cannot be helped," since there is positively no other fit abode.

We soon interviewed our " guides " for the lower part of the mountain, viz., two men with four horses, who were to convey the party to Las Tlamacas, the shelter-hut, where two real mountain guides were to meet us. Then we had to buy a pair of " petates," straw mats measuring about one yard by two, for sliding down snow-slopes. This seemed reasonable enough and promised excitement, but to the wonder and misgiving of the crowd present, we refused to invest in plaited sandals, or in the yards of cotton employed for protecting the feet from the cold whilst walking in the snow. For it is odd that hardly a single tourist arrives there properly shod, and although whole parties of them arrive in the winter season, few, very few, make a successful ascent. The invariable charge for each person, no matter how large or small the party, is twelve pesos.

We started at 12.30, and came in for the usual afternoon rain before arriving at the foot-hills, where the forest begins. Amecameca is situated at about 8,000 feet elevation. There is a road all the way up where timber, firewood, and the dairy produce of various cattle ranches are brought down, the track often following what are merely deep runnels which the rain has worn into the loamy soil. At the base the vegetation consists chiefly of the graceful, long-leaved *Pinus liophylla*, called here " tlac-ocote "—*i.e.*, small pine—and various kinds of deciduous oak, with a variety of other trees and shrubs. At about 9,500 feet appear fine firs, the *Abies religiosa*, or " oyamel,"

which form a belt of about 2,000 feet, interspersed with evergreen oak ("ilice"), thick bushes of small-leaved *Arbutus spinulosus*, and, in moister spots, a brittle kind of elder shrub (*Sambucus mexicana*), with long, narrow leaves, grey-green above and white below, the ugliest, most untidy-looking and absolutely useless shrub in the whole country. Then, at about 11,500 feet, the *Abies*, hitherto the dominant forest tree, becomes scarce, next there is but a mere sprinkle of these (still fine) trees, and then they suddenly cease. The same applies to an alder, with leaves much resembling those of the edible chestnut. These give way to the "ocote," a short-leaved pine. The open slopes are studded with masses of tall, richly-coloured, red and purple *Pentstemon*, and long-stemmed light blue lupins, which latter accompany us to the very limit of the tree-line. About half-way up, the road passes through a small cluster of hamlets, wooden shanties with a saw-mill, while above the pine forests and grassy slopes appears the cone in all its brilliant whiteness. There are but few ferns, in addition to the masses of Alpine flowers, but somehow or other the views are nowhere extensive. We arrived about 5 p.m. at Las Tlamacas—two large wooden huts, at an elevation of nearly 13,000 feet, constructed for storage of sulphur and shelter for the workmen. This sulphur industry has a curious record. Cortez sent a small party of his soldiers to the crater for sulphur in order to manufacture his own powder. He reported to the Emperor, Charles V., that although it was feasible to supply his ordnance with Mexican sulphur it would be far more expeditious to have it sent over from Sicily as before. Now and then a little company has been floated to work the crater, but invariably, after a short time, the attempt "se acabó"—came to an end.

There was a blazing fire of pine-logs in the chimney, because it so happened that only an hour before us two Americans had installed themselves there in order to make some surveys in connection with boundary regulations. Their presence was rather a bother, in spite of their numerous acts of helpful courtesy. But we made the best of it, had a light supper of our plentiful provisions, and settled down on our rugs and some hay on a kind of sloping plank bed. But it rained and rained

in torrents, and the ceaseless drip came through the old roof. We experienced, however, none of that nausea which so often spoils sleep at such altitudes, except that one of the engineers suffered severely from the typical headache, loss of appetite, and giddiness.

The rain cleared off long before sunrise, and we started with the two mountain guides, a man and a boy, at 6.30, in brilliant sunshine, without a breath of wind; but it was cool, temperature only 36° F. The path first crosses a deep, dry

POPOCATEPETL FROM LAS TLAMACAS.

ravine, the trees cease a few hundred yards above the hut, and tussocks of grass are then the only vegetation, together with the little *Draba*, the last of the flowering plants. Then began the steep slopes of red and grey lava, sand, and pumice-stone, and continued until, at about 7.30, we reached La Cruz, a big, rough wooden cross erected in memory of numerous accidents, mainly due to sudden snow-storms, which had befallen Indians employed in carrying down on their backs the loads of sulphur. This cross stands upon a prominent rock, at some 14,500 feet elevation, and here we had to leave our horses. These sturdy creatures can go up still further,

as on Citlaltepetl for instance, where the slope being more gentle, they go up to nearly 16,000 feet, but here the loose lava and ashes, into which the horses sink, and the steeper slope make progress very difficult, they pant painfully, and only frequent stops make it possible for them to regain their wind. The ascent proper may be said to begin here. We soon reached

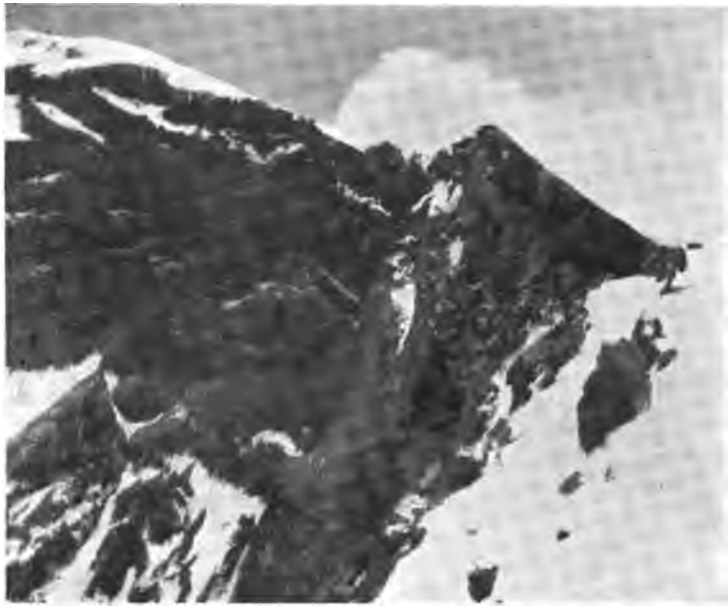
THE LAVA-SAND FIELDS.

the snow. Our outfit was of the scantiest. The guides swaddled their sandalled feet in many layers of cotton cloth, and carried two zarapes, with some provisions. Each of the party had a stout stick, or rather, pole, my wife wore a blue veil, I myself dark spectacles, and that was all. Ropes, spades, ice-axes, there were none.

The ascent, which is always undertaken on the north-eastern slope of the mountain, was easy. There are no

glaciers proper, and no crevasses, but always the same steep, smooth slope. The snow was in excellent condition, firm, with a thin hard crust. The guides floundered along anyhow, often slipping on account of their clumsy footgear, which gave them no hold. I myself kicked step after step into the snow for my wife to follow, and this step-kicking, continued for hours, became very exhausting work. The only danger to be apprehended was that of slipping down during the frequent short pauses, unless we rammed our poles into the snow to hold on to. The sky above us was of an unbroken deep blue; below, half-way up the mountain, were thick masses of clouds, hiding the landscape, and moving like billows of the sea, but in time there appeared rifts in them, and long before we neared the top most of the clouds had vanished. We experienced no great difficulty in breathing until nearing an altitude of about 17,000 feet. Of course, even so far it had been hard work, but then things became somewhat more serious. The heat of the sun and the reflection from the brilliant snow-fields were fierce, although the temperature remained at about two degrees of frost. Besides the ordinary tired feeling a curious lassitude, with slight nausea, made itself felt. It required some force of will to make fifty steps without stopping. Then these were reduced to thirty, twenty, and at last five. A few steps at once brought on panting and gasping for air, accompanied by an intolerable hammering and throbbing in the temples, with an increasing sensation of giddiness and a nauseous sinking feeling, though stopping brought immediate relief. We found the sucking of meat lozenges a great help. However, by 11.55, after a steady climb of four and a half hours, including pauses amounting in all to about twenty-five minutes, we arrived at the rim of the crater, which at this spot reaches a height of about 17,500 feet. On its very edge we rested for nearly an hour, and enjoyed the most glorious scenery. The crater itself is of an oval shape, lowest at the north-east, highest at the south-western corner, which forms the summit of Popocatepetl, reputed to be 17,600 feet high. The greatest diameter of the cavity has been recorded as six hundred metres; its depth perhaps half as much. But never mind the dimensions. Before

us was an enormous cavity, with precipitous walls which appeared black in the dazzling sun, and here and there with particles of snow on some prominent ledge, and gigantic icicles, veritable pillars of ice several feet thick and many yards long, festooning the walls, and close to these fantastic masses appeared bright yellow patches of sulphur, many of them burning or smouldering in closest vicinity to the snow. It



WESTERN THIRD OF THE CRATER.

was these that had caused the sudden stifling whiffs of brimstone which we had already noticed to our surprise and discomfort some time before the crater was reached. To collect the sulphur the Indians went down by means of ladders and staging, or were lowered and hoisted up by windlasses. The volcano is practically, although not quite, extinct, and certainly it does not emit any smoke. Keen-eyed observers in Mexico City say that in the early morning on very bright days thin

smoke may be seen; but this is not quite exact. It is the vapour rising from the melting snow, when the morning sun strikes the walls of the crater. One hundred years ago, however, the volcano was still emitting smoke, at least Humboldt has thus drawn his coloured sketches; and at Cortez' time it fully justified its Aztec name of the Smoking Mountain.

The view before us was sublime, with Iztaccihuatl right

IZTACCIHUATL SEEN FROM POPOCATEPETL.

ahead, appearing here, however, like a cone above an ever-changing belt of white clouds. To the left of it lay the Valley of Mexico; only to the right a thick haze prevailed, thus unfortunately shrouding anything beyond Puebla, unfortunately also Citlaltepetl, the tallest of all the giants of Mexico. We lingered, revelling in the surrounding beauty, for nearly half an hour. This was too long, as it proved later on. The descent was to be made on the "petates," down a shorter

direct curve of the slope. Not liking the idea of parting company, the guide, my wife, and self sat down on one of the straw mats, the guide gathering up the front edges, and putting his stick through them by way of a brake. At first the contrivance did not move, but when we got off at last we experienced a novel sensation, since with continually gathering speed we shot down into the unknown, as, owing to the peculiar curve of the slope, we could not see far ahead. Although we had been assured that there was nothing to impede our way, we passed close by several ledges of bare rock. The thought of landing upon one of them was not cheering; but we had several unforeseen stoppages. As I sat straddle-wise behind my two companions my feet slipped off the narrow mat, ploughed up the snow in an instant, and we three rolled over sideways. This happened several times, and acted as a most effective brake until the snow, which was thawing rapidly, became too soft, and for the next half-hour we floundered about, breaking through incessantly up to the armpits.

We arrived at the huts at 2.30, prepared a little soup, and left at 4 p.m. Clouds had in the meantime gathered round the volcano, and suddenly we beheld the grand spectacle of a tremendous thunder-and-snowstorm raging at the summit whilst the surroundings of the hut remained in sunshine. The ride down was beautiful. It had been decided to take a shorter track from the saw-mill downwards, since this would save much time, provided the way was in good condition. It turned out the reverse. Instead of one track, it divided into many, all rendered most awkward by last night's rain. At 6.30 we were still in the forest, and black clouds gathered over the plain, with distant lightning and rumbling thunder. Night sets in quickly in the tropics, and soon we got into a bank of clouds. It became so dark in the wood that we all had to dismount, and then scrambled—in a pitchy darkness—through a veritable maze of sharp ledges, puddles and roots, until one of the men called out to stop, and not to move an inch further. "Strike a light, for goodness sake, and look!" We stood on the brink of a cavity as large as a house, the track having completely vanished into some subterranean cavern. The stump of a

candle, found providentially in my pocket, saved the situation for the next ten minutes, and then the elder guide declared solemnly that our only salvation was to remount. "It is too dark and too dangerous for man to walk, horses see more at night. The pack-mule, as 'la mas racional' (the one which reasons best), must walk in front to pick the way." This was the most creepy ride I have ever had. I saw nothing whatever, except now and then dimly the light straw hat of the man in

ON THE TOP

front. Every minute came a warning shout or a stop, as our various creatures carefully picked their way, zigzagging to right or left, halting, and then lowering themselves into, or scrambling over, some invisible horror. We knew there was a little river to cross somewhere with a sharp descent, and full of boulders, but we never saw it—though there was no doubt when we were actually in it. What a relief when we emerged from the underwood upon the road over the plain. Incessant flashes of lightning showed up the ruts and puddles, stones, and overflowing ditches. The storm had continued to move

before us, and thus, although it was a rainy afternoon and night, it came to pass that we arrived at Amecameca at 9 p.m., without having encountered a drop. We hammered a long time upon the door of the inn, and it was near 10 o'clock before we got our much-needed rest.

The fierce sun had raised big blisters behind my ears, the skin of my neck and face was terribly burnt, and for days after it peeled off in brown flakes.

Within a week of this ascent we were encamped near another volcano, on the Nevado de Colima, when the sergeant of our escort proved equal to explaining my unusual appearance. " The patron has looked into the crater of Popocatepetl, and the fire has scorched his face."

CHAPTER XXIV.

THE NEVADO AND VOLCAN DE COLIMA.

The Mexican Volcanoes—The Recent Eruptions—The Town of Zapotlan—Camping on the Nevado—Altitudinal Changes of the Fauna and Flora—The "Escorpion"—A Newt and its Distribution—Woodpeckers—The Lake of Zapotlan—Goodbye, Perfecto.

Far in the south-west, where the little State of Colima is wedged in between those of Jalisco and Michoacan, stands an isolated group of high mountain peaks, the famous Nevado and the Volcan de Colima. Very few of the big Mexican volcanoes are known to have been active within the memory of man. The giant Citlaltepetl appears to be extinct, although there is a vague Aztec tradition of a big eruption, while Humboldt ornamented his sketches of this mountain with a cap of smoke. Popocatepetl, "the smoking mountain," is likewise not known to have been active, but is quiescent, only issuing sulphurous vapours. In the south-west, however, nearer the coast, and in the bend of the Sierras Madres, volcanic activity is far from being extinct. Witness the famous volcano Jorullo, which arose during a few weeks in the year 1759. The only really active volcano at present is that of Colima. It has been the subject of an exhaustive study by Padre Jose Maria Arreola, who lived for many years at Colima, and who, during the recent eruptive period, conducted observations in conjunction with the scientific authorities of the Seminary of Zapotlan. He has written two papers* on the subject;

* J. M. Arreola, "El Volcán de Colima. Boletin mensual del Observatorio meteorológico central de Mexico." 1896. "Las erupciones del volcán Colima en Febrero y Marzo, 1903, Guadalajara, 1903." Translated by F. Starr in "Journal of Geology," Vol. XI., No. 3, 1903; with eight illustrations.

COLIMA IN ERUPTION.
From "The Recent Eruptions of Colima," by R. R. Rivera.

one of which has been translated and reprinted by Professor Frederick Starr, of Chicago, that energetic student and explorer of all things Mexican, from the deciphering of hieroglyphic codices to the taking of plaster casts of the faces of unwilling Indios, and from prehistoric burial mounds to volcanoes.

The Colima volcano has from time immemorial shown many irregular periods of great activity and of quiescence. One of the liveliest of these periods, with grand displays, took place in the months of February and March, 1903. It has never thrown out lava, and the whole cone seems to be composed of sand, cinders, and pebbles. The heavier products fall upon the higher slopes, not more than two or three miles from the crater, where they do no harm. The scoriæ and sands are stopped in their course by the gorges, which exist about half-way up, on all sides of the mountain, and at various altitudes, this loose stuff being again cleared away by the rains.

At the time of our visit, September, 1904, the volcano was distinctly quiet, it did not even smoke, and the so-called smoke visible in the early mornings was nothing but the vapour arising from the rain-water when the sun shone upon the sand which chokes the crater. This is about four miles distant from the peak of the Nevado, and is reputed to be 3,960.90 metres high (12,991 feet and 9 inches). How this exactitude has been arrived at is immaterial. Suffice it to say that a total height of less than 12,000 feet seems to be nearer the truth, at least 2,000 feet less than the height of the Nevado, which is scarcely 14,000 feet, although this is likewise stated to be higher. However, people are prone to over-estimate everything, except their returns for the income-tax. Down to a level of 8,000 feet, all the vegetation had been scorched and killed by the hot ashes and sands, amidst which there arose the barren yellow, much-furrowed cone, with the crater on the southern side, and well below the top. We wished to see at least the scene of action; besides, these mountains offer interesting problems relating to the study of the geographical distribution of animals and plants. They are situated in the

gap between the Sierra Madre Occidental and the Sierra Madre del Sur. Moreover, they stand in the midst of the depression by which the plateau of the Mesa Central slopes gradually down towards the Pacific coast, and they mark the angle where the western sierra swerves towards the south-east, forming the southern boundary of the central plateau.

Well, the whole tour turned out to be a successful picnic, and very easy at that, for Mexico! It necessitated our going a long railway journey to Guadalajara, and thence by a branch line right on to Zapotlan, in all 480 miles. Leaving Mexico City at 6 p.m., we just had a glimpse of Guadalajara (the "Pearl of the West") on the following noon, and arrived at Zapotlan at 5 p.m. The line passes over the Mesa Central at an average elevation of 5,000 feet, flat country, covered with the alluvial *debris* which overlies the erupted masses, and the older calcareous formations. These accumulations of more or less sandy soil form plains, without any forests. Here and there a field of lava crops up, and there are a great number of "valles," fertile plains, interrupted or partly surrounded by the outcropping volcanic hills. There is a marked change when we approach the State of Jalisco, or the "Sandy Land," with its terraces of lakes; the lowest is the fine stretch of water of Lake Chapala, the largest in the Republic. Further south is the Lake of Sayula, while still smaller and higher up is that of Zapotlan. During and after the rainy season, the country appears as one continuous mass of green meadows studded with numerous little lakes, ponds, creeks, and pools, fringed in the distance with wooded heights, and covered with thousands of white *Nymphæas*, rushes and reeds in dense clumps, a paradise for aquatic life. Towards the south the Nevado looms up, its broad base clad with dark green forests, then a belt of clouds, and above it the bare, light brown peak, which, just falling short of the permanent snowline, is, as its name implies, often "besnowed."

Zapotlan, at an elevation of 5,000 to 6,000 feet, is a thriving town, with a large, well-kept, garden-like plaza, a fine old church with monastic buildings, now transformed into a flourishing "seminario," and some good houses belonging to well-to-do

merchants; but the bulk of the town consists of houses of the adobe type, built with sun-dried bricks of yellow loam, and covered with the usual double-curved tiles. The town lies on a plateau, which slants slightly towards the lake. Hence, many of the lower streets, whether paved or not, become quite impassable during the rainy season, as they are turned into natural water-conduits. The passer-by has to pick his way along the house-fronts, over the projecting doorsteps, cross and re-cross, and then, more likely than not, retrace his steps

ZOPILOTES.

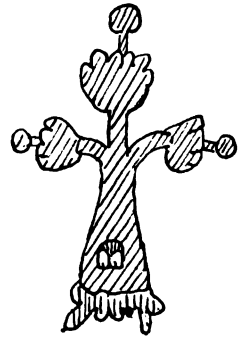
at a spot where the pavement has vanished, and a gap of ten feet in depth has been eaten into the rich brown clay. All the filth and garbage collects in these holes, which are the undisputed domain of dozens and dozens of black turkey buzzards, the "zopilotes," which, knowing their value as the only scavengers, scarcely deign to hop out of your way.

On recommendation we went to the Hotel Cosmopolita, which was not a pretentious building, being neither hotel nor lodging-house, but a hostelry. The wall of the "patio" was covered with some thirty cages, wherein ground-squirrels

and birds of various kinds, from singing-birds to doves, were kept in scrupulous good order. They were the pets of our landlady, who pointed out one pigeon as having been in her possession for thirty-one years. I do not know whether it is given to these birds to be so long-lived, although such has been asserted, but am inclined to believe it in this case, considering the care which she bestowed upon her birds.

It may be as well to describe an example of the typical, unpretentious lodgings. It is a room with whitewashed walls, a single iron-barred window, one foot above the pavement, giving directly into the street, and a floor formed by red-backed tiles which are always damp, and contains two iron bedsteads, with the usual very hard Mexican mattress, a blanket, pillow, and bedspread, and an iron washing-stand holding a tiny enamelled basin. That is all. Water will be doled out to you by the brown, sandal-shod " mozo," if you can catch his attention, but he prefers smoking and gossiping in the passage of the doorway where muleteers collect, and where they wait to offer to take you to Colima, since that can be the only object of any stranger stopping at Zapotlan. Somehow—it may be imagination—I felt here more amongst Spanish-speaking people than I did anywhere in Morelos or in Guerrero. Spaniards and Basques settled early in the West, in and around the present Guadalajara, and they brought the country to a considerable state of civilisation and cultivation. Far removed from Mexico City, Oaxaca, Puebla, Vera Cruz, and similar centres of never-ceasing political disturbance, they did not " pronounce " so much, *i.e.*, did not issue " pronunciamientos," or political programmes, or initiate risings against the powers that happened to be. Maybe that the native Indian substratum was a favourable one, since it consisted of the Tarascos, who form the aborigines of Jalisco and Michoacan, a reserved nation, appreciative and capable, of indigenous, as well as of Spanish arts. In many parts, however, they were overrun by Aztecs, There is no Tarasco spoken now, while the next town, Tuxpan, is a purely Aztec settlement, where Aztec is the prevailing language, and the inhabitants are, by the people of Zapotlan, considered as decidedly inferior.

The town itself enjoys a double-barrelled name. It is the frequent custom, for political reasons, to substitute the name of some famous man for the usual native name of a town; for instance, Chilpancingo is officially known as Bravos, and so, too, is Zapotlan now known as Guzman. Some of the inhabitants indignantly repudiated the idea of their being of Aztec blood. "Yes," said they, "we understand Aztec, and we speak it to be able to get on with those heathens, but we are Zapotecas." This information puzzled us much. Imagine the finding of Zapotecs, the ruling tribe of the State of Oaxaca, here in this far-off western town! And yet the



HIEROGLYPH—ZAPOTLAN.

"Place of Zapote trees."

Tlan = close together, expressed by two front teeth and the red gums inserted into the green fruit trees.

explanation was simple enough. Our informants meant that they were inhabitants of Zapotlan, or, people of the place where the "tzapote" trees grow.

The most influential gentleman in the place, Sr. Teofilo Sanchez Aldana, banker and landowner, made things easy and pleasant for us, and procured the necessary riding and pack-animals with (last, but not least) a reliable servant. This, an elderly, rather well-educated man, had the appropriate name of Perfecto Sanchez. Attentive, ever obliging, civil-spoken and good-mannered, full of quiet humour, and gifted

with irresistible persuasive powers, he was indeed a perfect treasure.

A telegraphic message sent to the Governor was promptly and most courteously responded to by the despatch of a sergeant and two men of the mounted police from Sayula, who presented themselves ready next morning, when our cavalcade set out for the Nevado, which is in full view of the town, whilst the much lower volcano just peeps over a shoulder of the Nevado. As nobody could impart information about the mountains, we had to trust to luck, and followed the track towards Colima, and at a hamlet called Las Canoas enlisted the services of a small boy to show us the way to a cattle-ranch higher up. The people there were disobliging, being naturally distrustful of our escort, and it was with difficulty that they were at last induced to direct us to a spot on the eastern shoulder where was a cattle trough with a little fountain. There in the forest we established our first camp at 6,600 feet, after a ride of five hours from Zapotlan. Early next day we struck camp and wriggled our way through the pathless forest up the south-eastern slope until, on a ridge 8,000 feet up, we found a lovely spot in full view of the volcano. Our pack-animals had stopped half-way; it would have been possible to bring them up, but in the meanwhile we searched for water. The search was in vain, not a drop was to be found on the whole southern slope, although it was covered with thick forest; the loose, volcanic ground lets all the water through like a sieve. There was a "barranca," some hundreds of feet deep, with sheer, precipitous walls, all covered with exuberant growth, whilst at the gloomy bottom huge ferns indicated the probability of water, but it proved to be inaccessible. Next morning we moved back to the rancho not in a happy frame of mind, and practically captured one of the men to take us round to the north-eastern side. Why had nobody told us what we should find there? An elaborate water-conduit had been constructed on this shoulder, taking the water from high up, and supplying not only all the ranches near and in the plain, but also several of the towns, *e.g.*, Tuxpan. The water flows through earthern pipes, while at every 1,000 feet or so of elevation there is a

well-cemented brick tank with intake and outlet for the overflow. Thus the tank is always full of running water, while the stages before mentioned prevent any undue pressure. What could be better than to follow this conduit from tank to tank ? Near one of them we established our camp at 9,500 feet. Much further up it was too difficult for the pack-animals to follow. Although everything was soaking wet there was no running water, nor pools, and the brooks were full only as long as it rained, which it did, heavily, at this camp, mostly

VEGETATION AT 9,500 FEET. NEVADO.

beginning in the late afternoon, and continuing right through the night. Besides, this was the level of the belt of clouds which, even on many fine days, surrounds the mountain. The thunderstorms, however, raged below us, and during these times we also had rain ; otherwise everything was wrapped in dripping mists. With deliciously cool and pure water in the gurgling tank, and with abundance of firewood, our party made themselves comfortable around a roaring fire. Our men, all handy, and entering into the fun of the thing, were given the tent-annex by way of shelter, and built themselves a cleverly-contrived staging, a foot above the soaked ground.

The spot was in the midst of dense forest, composed chiefly of evergreen oak, large-leaved deciduous oak, and huge strawberry trees, or arbutus. Polypody in profusion covered the weather side of the stems; tillandsias adhered, like pine-apple tops, to the branches; enormously long pendent cactuses crawled and swayed about, and every branch or twig was festooned with yards of the greenish-grey lichen, *Usnea*. Life was scarce, and hardly a bird was to be heard or seen; but centipedes and small black scorpions abounded in the stumps, most of the scorpions with a load of their still white young ones on their backs. It was very easy to catch the scaly *Sceloporus* lizards, as they hid beneath the bark, stiff and lethargic from the prevailing cold, the temperature at sunrise being only 50° F. Nowhere were either frogs or toads to be seen, since they require standing water to rear their young in, and the total absence of these creatures could safely be assumed from the fact that none existed in any of the tanks, although these had been established for at least a dozen years; only a diminutive kind of *Hylodes* hopped about amongst the leaf mould.

Now let us ascend. A little above the camp *Abies* appears, and soon becomes plentiful; then the blooming tillandsias finds its upper limit, together with the deciduous oaks, which give way entirely to an alder (*Alnus jorullensis*). Fiery red salvias, ten feet high, bloom in profusion, together with a tall, likewise red, thistle, called "cardo santo." Small-leaved sedums live on the tree-stems, together with polypody, and a peculiar single-leaved fern. Whilst at this level of about 10,200 feet, on the southern slopes of these mountains, herbaceous vegetation finds its upper limit; here, on the north, away from the sun and with more moisture, it ascends considerably further. The topmost tank stands in a beautiful spot affording a glorious view of the Nevado, which rises there like the Matterhorn. Here, at 11,000 feet, we met by chance a lonely herdsman without occupation, who was willing to act as guide. The trees are here composed chiefly of big *Abies*, and a large, rather short-leaved "ocote," somewhat resembling the Austrian pine. The alder having ceased, yellow coracopsis,

dark red-purple pentstemons, orange flowers like snapdragons, tall blue lupins, white oxalis, with long-stalked trefoil leaves, thick fat sedums, in size and shape almost like squat agave plants, an abundance of saxifrages, and everywhere enormous tussocks of fine-bladed grass (*Agrostis*) made up the characteristic vegetation. Nowhere were any maidenhair, or other ferns, to be seen, but all the trees were covered thickly

THE NEVADO SEEN FROM 11,000 FEET LEVEL.

with moss and pendent lichens. The "ocote" pines alone go up further, to about 12,200 feet, forming at first a continuous forest, then patches, and then ceasing rather suddenly without dwarfing. Thenceforward there was short grass in tussocks, and, lastly, the barren pinnacle of the cone, for at least a thousand feet, covered mostly with loose *débris*, yellow or light brown in colour.

The mountain here forms a vast amphitheatre, closed in on every side by steep, often abrupt, slopes, with a brook at the

bottom, the source of the conduit. The whole forms, as it were, an immense corral into which the cattle are taken, and where they are left practically to themselves, as they cannot get out. By mid-September they are taken down again. There was a log hut, a sort of dairy shelter. Lightning had burnt many of the pine-trees, and on their black scorched trunks were basking numerous lizards (*Sceloporus microlepidotus*), the darkest specimens I have ever seen, beautifully adapted in their almost black garb to their temporary surroundings. But the main object of our visit was what we may well call the "hunting of the snark." From the coast of Guerrero for three months we had been haunted by the account of a lizard which was described in the following terms: "The 'escorpion' is the most dreadful beast in existence. He is unkillable unless you crush him with a big stone. Foolhardy people have suspended him in a cleft stick; the poison which then drops to the ground causes all vegetation to wither for yards around. Cattle who tread on such spots lose their hoofs, even those which browse off grass crept over by the 'escorpion' soon decline and die." We knew that this terror could not possibly be the Gila monster (*Heloderma*), a sluggish, but poisonous beast, the only noxious lizard known. At Zapotlan we had been warned against it. The rancheros below had flatly refused to procure one, and to our surprise they said it lived "higher up, on the Nevado." Here, then, was a problem. Our guide was at last prevailed upon to take us to the spot where the beast lived, the agreement being one peseta for each and every specimen seen. Not far from the hut he suddenly stopped and stood as rigid as a pointer. An "escorpion" had slipped into a tussock. Of course, I rummaged about until I got it, a fine specimen of the amiable, harmless, and easily-tamed lizard, *Gerrhonotus imbricatus!* Everybody yelled when I held it up for inspection, and allowed it to bite my finger. Epifanio, the sergeant, folded his hands in mute consternation, the ranchman lifted up his walking-pole as if prepared to bring it down upon the lizard and myself at the same time, and Perfecto said solemnly: "Patron, we do not want to lose our chief; take care, you do not know what you

are in for." Well, we caught a fair number of these "escorpions," which were basking upon the tussocks, and which, at the slightest warning, vanished into the masses of rotten grass. The ranchero received a good many pesetas which, no doubt, convinced him that we strangers were really quite mad. We talked " escorpion " for hours, and thrashed the matter out until nothing remained but the hard straw of superstition,

THE HUNTERS OF THE " ESCORPION."

of which plentiful crops are grown by every nation, those who pride themselves on being superior to others having the least excuse. Perfecto ruminated upon the matter for some time, and then put to the herdsman the following poser : " How is it the many ' escorpiones ' hereabouts have not long ago killed off all your cattle ? " Of course, this was not a fair question to ask a fellow who had grown up in these surroundings.

A few days later we met with the same kind of *Gerrhonotus* a few hundred feet below our camp, amongst the withered

leaves of oak trees. Fallen and mouldering trunks were inhabited by the small scaly *Sceloporus*, and also afforded convenient shelter to grass-snakes (*Tropidonotus*), and to the little rattlesnake (*Crotalus triseriatus*), which is so characteristic of moist Mexican mountains.

The cloud-belt marked a kind of special zone of distribution. A little below our camp, for instance, was the upper limit of the large, pendent mistletoes, of the genus *Loranthus ;* here, too, grew yellowish-green, flowering orchids, and clusters of tillandsias grow on the oaks, chiefly the small-leaved " encino " and " roble colorado," a deciduous oak, together with the fine and long-leaved " ocote " ; " cirimo " trees, with flowers and leaves like our lime trees ; of laurels, *Nectandra sanguinea ;* " capulin " (*Ardisia revoluta*), with its smooth, dark leaves and cherry-like fruit ; the snake cactus, the lichen *Usnea*, and *Tillandsia usneoides*. This was also the lower limit of the " alisa," or alder, and of a few solitary *Abies*. An enormous dahlia with mauve flowers grew high up in an oak tree. Bracken was plentiful.

A marked change takes place below the cloud-belt, coinciding with an approximately sharper slope of the mountain shoulder, at an altitude of 7,200 feet, which is heralded by an outburst of scarlet dahlias, maidenhair, and bracken, in a forest of arbutus, deciduous oaks, and huge-coned pines. A few feathery-leaved, red-flowering mimosas indicate a further change on more open ground, which is covered in profusion with tall, almost shrub-like, *Senecio*. Yellow and red mimosas become prevalent ; purple convolvuli trail over the ground, which is also studded with white orchids, and the forest trees are reduced to the two kinds of pine, with the addition of evergreen and deciduous oaks in more shady depressions. All these changes are reflected by the reptiles. For instance, the upper limit of the mimosa coincides with the lower limit of the small-scaled lizard, while the larger and rough-scaled *Sceloporus acanthinus* takes its place. Little anolids, in their delicate drab or buff garb attract our attention, by unfolding their gorgeously-coloured throats, which they stretch out in the form of a disc, coloured pink and blue with white specks. Then the

disc collapses, and the lizard seems to have vanished, as its dress mingles so well with the brown mimosa branches upon which it disports itself. Snakes (*Leptodira*) are basking on the ground, and, when cornered, display a ridiculous semblance to rattlesnakes in respect of their colour-markings, which are enhanced by their threatening attitudes. But their broadened jaws, with the sideward kink of the head, their hissing, and their striking poses are nothing but make-believe. Further, there are "salamanquescas," skinks scarcely six inches in length, with tiny limbs, hard of scale, and as slippery as glass, with a brittle tail the colour of which is their glory, it being of a beautiful, gleaming azure-blue, whilst the glittering body is brown. They bask on the ground, but on the slightest alarm flit away amongst the leaves between your very fingers, and are lost in the soft, mouldy ground. When you have secured one, and, as you think, safely tied him up in a bag, the most likely place to find him again is somewhere up your sleeve or tucked away under the collar of your coat. Our specimens continued to play at this game even during our long train-journey home, when my wife discovered one in her pocket. The last *Eumeces lynxe*, to give its technical name, I grabbed just as my right hand was occupied with a twisting and wriggling *Leptodira*. Perfecto and Epifanio came to help, armed with a long forceps; they were prepared to tackle the snake, but when they understood I was lying upon a "salamanquesca" it was all over with them, since these creatures are, according to general belief, extremely poisonous.

It never rains but it pours. While thus busy we made *the* discovery of the whole Nevado excursion, another apt illustration showing how patchy and accidental are the results of such zoological investigations. I had kept a keen look-out for *Spelerpes* newts, although I did not expect any on this mountain, and we had rummaged an untold number of rotten stumps during the last few days in search of the tiny *Thorius*, all without avail. But here Perfecto was chasing a lizard upon the stump of a pine-tree, and as we dislodged it from beneath the bark, we found there one solitary young specimen of *Batrachoseps attenuatus*. Although it was the only newt

which we got during the whole excursion, it was worth all the rest of the other creatures, since it was the first and only occasion on which a *Batrachoseps* had ever been found in Mexico. The genus, closely allied to *Spelerpes*, has a wide range in the United States, one, *B. scutatus*, ranging from Illinois to Rhode Island, and to the Gulf, whilst other kinds live in the Pacific States, from Oregon to California. Quite unexpected, therefore, was the occurrence of this Californian species (*B. attenuatus*) on the Nevada de Colima, and probably it occurs all throughout the slopes of the western Sierra Madre, which is mostly clad with pine forests, a stretch of about a thousand miles, where it is still unknown. This little creature on the Nevado opens up a large question. Newts could not well survive in any of those districts which had become overlaid by the volcanic formation, which, in the north, extends in an unbroken stretch for about two hundred miles, until the gneiss is reached, to the north-east of Mazatlan. There are, however, patches of granite and limestone, some even not far from the Nevado, which, theoretically, may have acted as islands of refuge for the newts during the times of prolonged volcanic activity. From such enclaves they could re-people the lost ground, as, for instance, the newly-risen Nevado itself; but these volcanic ranges have, at the best, risen a long time ago, and it is not likely that the newts thus cut off should have remained unaltered in species and identical with those in far-off California. The *Spelerpes*, which I consider must have already existed in Mexico during Miocene times, during the western volcanic upheavals, has in this country developed into many species, differing in the north, centre, and south. But our *Batrachoseps attenuatus* and the *Amblystoma tigrinum*, being identical species both in the States and in Mexico, we have to look upon as comparatively recent immigrants from the north-west. How long ago this immigration took place we have not the faintest conception. That these newts can spread, or widen their range, is shown by the fact that they have established themselves on the volcanic Nevado itself. If we give them the ridiculously low time-limit of ten thousand years to cover the distance from California

to Colima, the average rate need have been but one mile in ten years, or six hundred feet per year, a distance which these little creatures can cover in one day should they be so inclined, and if there is any continuity of suitable terrain. But this is a very big "if." Let us, therefore, increase the difficulties tenfold, and the result still remains within very reasonable possibilities.

A woodpecker (*Melanerpes formicivorus*), called "carpintero ocotero," or the "pine carpenter," frequents the pine forests. We have seen many trees into the bark of which this bird had inserted nuts, acorns, and small pine cones, using the cracks in the bark as a kind of anvil or vice. By repeated use long semicanals are driven into the bark, sometimes six inches long. I cannot vouch for the story that this bird uses the hollow, pithy flowering-stalk of the agave, drilling a hole into it, and filling it with acorns as a store for the winter.

Descending to Las Canoas by another track, through pines and mimosas, and over rolling pasture grounds, we passed by a curious-looking natural cavity, almost circular in shape, about one hundred yards across and eighty feet deep, with nearly vertical walls, the bottom studded with trees and shrubs. It was said to have been formed by a "culebra de agua," a sufficiently startling explanation, even if one recollects that in this case "water-snake" stands for water-hose or water-spout. The hole was, no doubt, caused by the collapse of a subterranean cavern, the flat-backed ridge, near the lower shoulder of which it stands, being in reality one of the many arms of lava which radiate out from the mountain. Below Las Canoas is an extensive pedregal, or lava-field, rugose and studded with some kind of small mamillaria cactus, the tiny red fruits of which our men praised as good to eat. Its diminutive fruits are quite smooth and bare, whilst the plant itself is covered all over with long and viciously-curved spikes.

Once off the mountains proper we delight in new kinds of flowers. On rocky slopes grows the "huele de noche," a bulbous plant, with white star-shaped flowers, emitting a strong, delicious scent during the night, whence its appropriate name. Gorgeously-coloured *Tigridea* fringe the edges of ravines,

and in damper places make a show like tulip beds. Purple-brown *Fitillaria* preferred the neighbouring oak-woods. Leguminous shrubs, such as *Cassia*, with their golden-yellow bunches of flowers, and the lovely sulphur-coloured, richly-scented, trumpet-shaped blooms of the tree *Tecoma æsculifolia* grow in the ravines, and a solaneceous shrub with woolly leaves, mauve, potato-like flowers and curved spines, justifies its name of "ungue de leon," or "puma's claw."

We wound up our stay at Zapotlan with an excursion to the lake which lies in the midst of meadows and swamps, here

FOUR-IN-HAND OX-CART.

and there fringed with willows and poplars, all of which are the bearers of big clumps of "inhiesto," a kind of mistletoe, or *Loranthus*, the red and orange bunches of its blossoms, one, or even two feet in diameter, attracting the eye from afar. The rootless stem grafted upon the host, can be severed when dry, and leaves a pretty, star-shaped rosette impressed upon the branch. Such pieces are polished and sold as "flor del palo," or "wood-flowers." The amount of water in the lake varies much according to the season. During the rains it is of a turbid yellow, and inundates the country for miles around. Cattle waded about amongst the rushes, pestered with enormous

leeches, some of which promptly fastened themselves on to us as we waded about in search of tortoises. Of these latter, only one kind (*Cinosternum integrum*) is very abundant, most of their shells being in a leprous condition, owing to the tiny algæ which live parasitically upon them, boring their way through the horny scutes. Deep irrigation ditches were the home of large specimens of the monstrous frog, *Rana montezumæ*. On the higher, sandy parts, ground-squirrels, (*Citellus*) disported themselves, and one ranch was literally

THE LAST OF THE NEVADO.

swarming with fat lizards (*Sceloporus torquatus*), the males with black and dark-blue under-parts. Dozens and dozens of them were basking on the tiles of the roof, and the walls of sun-dried brick were riddled with holes made by these lizards to serve as their homes, which they shared with a kind of nest-making harvest-mice.

The up-train was scheduled to leave Tuxpan, the present terminus, at the cheerless time of 5 a.m. Our men must have

bragged not a little about their prowess. Perfecto, who saw us off at the station, was the centre of an agitated group. "My patron," he said, "I have told these gentlemen that we have caught escorpiones and salamanquescas on the Nevado; will you tell them how you did it?" "Con la mano"—"By hand, of course," was the answer. Withering superior smiles and the shaking of forefingers were the only response, and at this Perfecto said: "What is the good of all our doings on the Nevado, our camping above the clouds, ascending far beyond the highest regions of life without any air to breathe, our catching the most noxious creatures with our own hands. What is the good if nobody believes us?" "My dear Perfecto, they will appreciate it in England, where people are supposed to lie less, and, therefore, believe more, and sometimes even the tales of travellers."

THE END.

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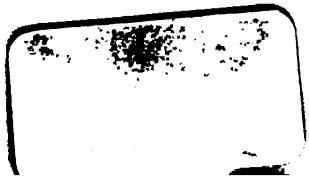
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